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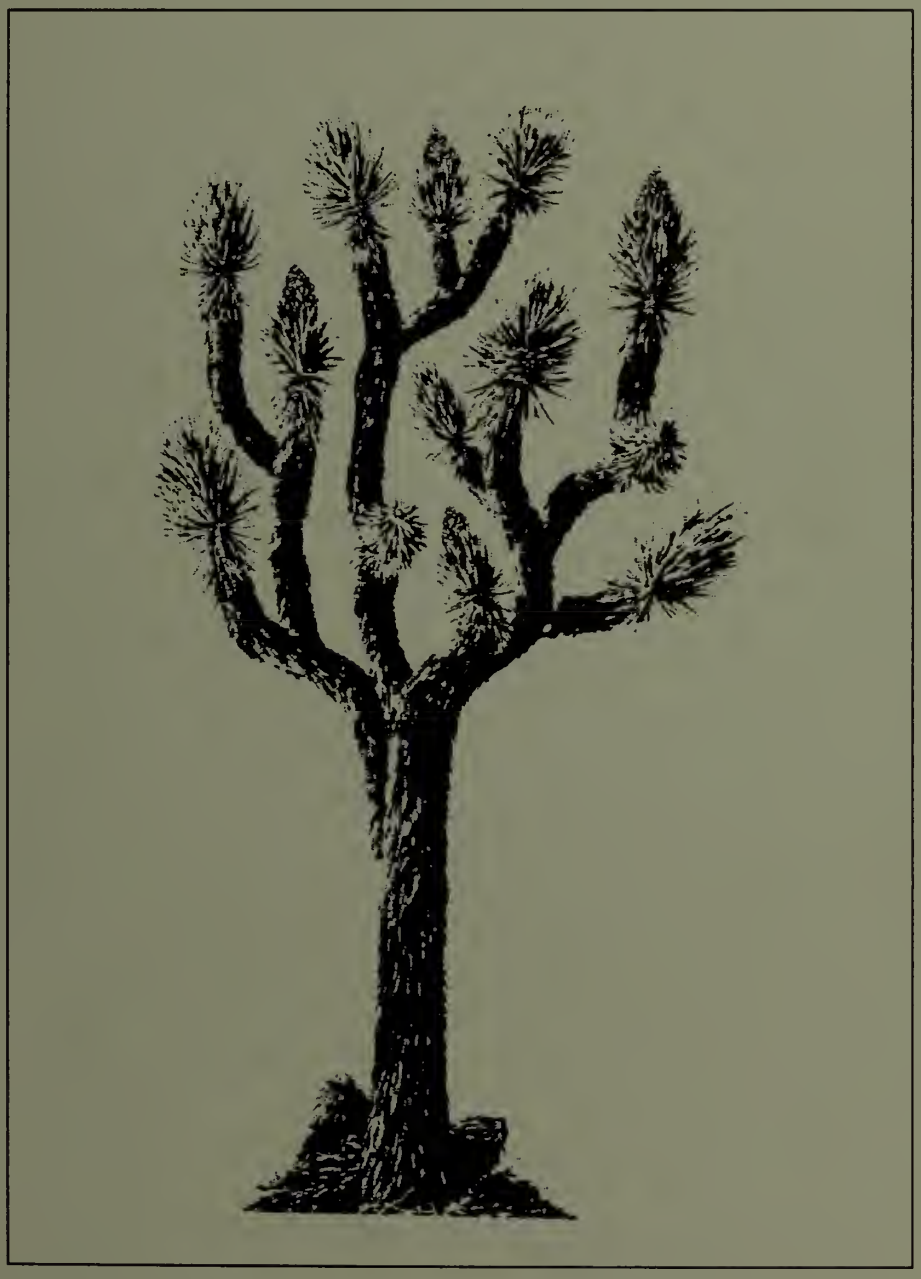
Environmental Assessment
Reconstruction of Park Routes 12, 13, and 112
and
Associated Visitor Use Areas



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associated visitor use areas

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august 1991

JOSHUA TREE NATIONAL MONUMENT • CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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EXECUTIVE SUMMARY

INTRODUCTION

Joshua Tree National Monument was established by Presidential Proclamation No. 2193 on August 10, 1936, (50 Stat. 1760). In 1975 the monument was incorporated into an international system of Biosphere Reserves under the United Nations Man and the Biosphere (MAB) program. In 1976, Public Law 94-567 designated 429,690 acres as wilderness and 37,550 acres as potential wilderness additions within the monument.

Annual visitation to the monument passed the one million (1,026,430) visitor mark in 1990. Within a 100-mile radius of the monument there are over 12 million potential visitors. Because of the favorable climate, the monument is open year-round, seven days a week. About half the annual visitation occurs from February through May. Visitor activities include hiking, backpacking, sightseeing, rock climbing, and camping, all of which depend on the transportation network of the monument. In 1990 over 230,000 visitors camped in the monument, 60 percent in large RVs.

In 1984 the National Park Service (NPS) prepared a Transportation Study/ Road System Evaluation for Joshua Tree National Monument. That study was developed in response to the Surface Transportation Assistance Act of 1982 (P.L. 97-424; 23 USC 202), which addressed the nationwide need for rehabilitation and upgrading of deteriorating public roads. The funding authorized by this act has enabled the NPS to implement a multiyear program – the Federal Lands Highway Program (FLHP) – for phased improvement of individual park road systems.

As part of the FLHP, the NPS in coordination with the Federal Highway Administration (FHWA) is currently upgrading and improving the roadway system in Joshua Tree National Monument. The 1984 transportation study identified the serious roadway deficiencies within the monument and proposed solutions in a prioritized listing. Several roadways have already been improved to meet the Park Road Standards (1984). Several others however, are still deteriorating as a result of vehicle use for which they were not designed.

Route 12 is one of two principal park access roads in the monument. In 1987 a 6.5 mile section of this road was reconstructed immediately east of the Geology Tour Road intersection. Presently 9.70 miles of route 12; the entire 5.60 miles of Route 13, the Keys View road; and a 0.1 mile segment of route 112, the Indian Cove access road are scheduled for improvements. These road sections are associated with the seven visitor use areas of the West Entrance, Wonderland of Rocks, Cap Rock, Keys View, Geology Tour Road, Ryan Mountain, and Split Rock/Live Oak.

The purpose of this environmental assessment is to evaluate alternative solutions to repair and rehabilitate the existing roadways and seven associated visitor use areas in order to:

- Fulfill the monument's purpose and management objectives
- Protect significant resources
- Improve circulation and eliminate safety hazards

- Improve the visitor experience and visual quality

- Reduce maintenance requirements

In 1990, the government offices of San Bernadino and Riverside counties and the City of Twentynine Palms were asked to review an early draft copy of this document. Their comments are contained within Appendix B.

THE ROADWAY

These roads were originally built by miners to accommodate wagons and teams and the same basic alignment is followed today. The historical alignment of both routes 12 and 13 allows visitors the opportunity to see the monument as it has been seen in historic time. Magnificent specimens of very large and old Joshua trees at the edge of the pavement. The narrow roadway winding through huge Joshua trees at the road's edge gives visitors the feeling of driving through a desert forest.

While the roads provide a unique visitor experience reminiscent of a bygone era they also present some problems for modern vehicles and traffic volume. Such problems are a result of the existing park roads being deficient in several aspects of modern road design – for example, the existing road: is too narrow for the types of vehicles that presently use it; has an inadequate structural base; has alignment and drainage problems; has an insufficient number of turnouts and parking areas; and has safety hazards (especially for recreational vehicles along curve sections).

Looking at these problems in more detail, there is little or no structural base material under most of the roads in the park. When the original wagon roads were converted to paved roads desert material was pulled into the road, mixed with oil, bladed smooth and compacted. These structural inadequacies are compounded by the narrow width of most roads. When large, heavy vehicles (RVs, tour buses, park maintenance vehicles, etc.) are forced to drive on the outside edge of the narrow road they break down the pavement edge. This is a direct result of the lack of lateral support normally provided by base material and/or shoulders. The broken edge must be patched or the road continually gets narrower. As the roads continue to deteriorate, maintenance requirements will continue to increase, though maintenance resources are unlikely to change.

Certain sections of both routes 12 and 13 are also deficient by modern alignment standards. Most roads are posted for 35 or 45 mph which requires certain sight distances. However, the winding and rolling nature of the roads does not provide adequate sight distances for safely driving these speeds. Narrow roads also tend to cause drivers to crowd the center line. When this occurs in combination with large vehicles and poor sight distances on two way roads, accidents are more likely.

A parkwide summary of traffic law enforcement and accidents handled by NPS rangers for 1980-1989 shows a yearly average of 34 accidents. Injury accidents occur an average of once each month serious injury accidents occur an average of one every two months and fatal injuries average one every ten months. Of the 328 accidents reported during this time period more than half (175) involved significant vehicle damage. There were 54 serious injuries and 12 fatalities involved in the 139 injury accidents.

Rangers also report that the majority of accidents result from excessive speed on unexpected sharp curves. The most common type of accident is the single car rollover. Although accidents occur almost anywhere in the monument, the campground and pullout entrances along route 12 and the road from

the Twentynine Palms entrance to Pinto Wye seems to be most unsafe due to poor sight distance and vehicle/pedestrian congestion.

Alternatives Considered and Their Environmental Impacts

For the roadway four alternatives (see Alternatives – Routes 12 & 13 map p. 26) are considered: No action, which would make no improvements except for routine maintenance; alternative A, a partial one-way loop, which combines one and two way sections of the road to balance resource preservation, visitor experience, convenience, and safety; alternative B, primarily a one way loop system for maximum resource protection and visitor safety; and alternative C, a wide two way road for maximum visitor safety and convenience.

Although each of these alternatives seeks to fulfill the monument's purpose and management objectives, each has a different emphasis and therefore has slightly different objectives. For example the primary emphasis of the No Action alternative is to leave park resources undisturbed and act as a control in order to provide a comparison with the other actions being considered. However, after reviewing the accident statistics and maintenance expenses for the road, it appears that the road has some design flaws that make it unsafe and costly to maintain. Such expenses and accidents are likely to increase in the future as the road continues to deteriorate. The emphasis of the first alternative(C) investigated was to reduce maintenance expenses and accidents. The easiest method of accomplishing this was to bring the road up to modern standards as has been done elsewhere in the park.

This would primarily involve widening and realigning the existing road as well as adding base material to it. However, since this section of roadway traverses some of the finest Joshua tree stands in the park, the extent of required widening would affect a large number of trees. Narrowing the road corridor and reducing the design speed (to eliminate some curve realignments) was considered, but, this would result in some of the same maintenance problems (pavement edge breakdown) experienced on the existing roadway.

Since narrowing the road was not feasible, other options were considered to reduce the impact of the road on the Joshua trees. The principal method considered was to route westbound traffic over the Queen Valley road so that the existing route 12 corridor could be used to maintain a one-way eastbound route. The current road width could even be narrowed to accommodate the one-way route substantially reducing impacts on the Joshua trees. This is the approach of alternative B, the environmentally preferred alternative since it has the least impact on the Joshua trees. However, this approach created other problems – visitors traveling from the east would have to travel longer distances to Keys View and visitors at Ryan Campground would have substantially longer travel distances to the west entrance and Keys View. Ranger patrols would also be less efficient.

So the preferred alternative (A), which modifies the one-way loop proposed in alternative B, was developed to handle this problem. Its primary emphasis is to reduce impacts on the Joshua trees and to provide for visitor safety and convenience. Alternative A was selected as the Preferred Alternative because it offered the best compromise solution of reducing impacts on Joshua trees and providing for visitor convenience and safety. A description of each alternative and its' environmental consequences follows.

The **No Action Alternative** objective is to act as a control in order to provide a comparison with the other actions being considered. To achieve this objective there would be no modifications to the existing roads. The roads would be maintained and repaired on an "as needed" basis, but no substantial improvements would be done.

This alternative would have no additional effect on native vegetation, cultural resources, the desert tortoise, and the visitor experience. Visitor safety would continue to be a major concern. As the roadway continued to deteriorate, the number of accidents, serious injuries, and fatalities could be expected to increase. These currently average 34 per year, two per month, and one every ten months respectively. Roadway maintenance requirements would increase as the roads continued to deteriorate.

Alternative A (Preferred) objectives are to:

- Mitigate the effects of the road reconstruction project on the Joshua trees.
- Diversify the visitor experience,increase safety, and provide reasonably convenient access to features of interest.
- Avoid impacts/effects to known cultural resources.
- Ensure the compatibility of this reconstruction effort with past reconstruction efforts on Route 12.

Actions proposed to achieve these objectives are: Route 12 segments 1, 3, 4 and 6 would remain open to two way traffic. All of these segments would be reconstructed to the same 26 foot width used on previous reconstructions of that road. Segment 2 of route 12 would be a 14 foot wide one way road going east. Segment 5, the Queen Valley road would be a 14 foot wide one way paved route going west, with two realignments in the Hidden Valley area.

Since widening of the Keys View road, Route 13 (segment 7), would have the greatest impact on Joshua trees of all the roads in the project, it would not be widened. It would remain open to two way traffic and be reconstructed at its' present width of 20 feet and. For safety, vehicle restrictions excluding vehicles over 25 feet long and/or 8 feet wide would be restricted from this road. A parking area would be provided near Cap Rock to allow large vehicles park. Route 112 in the Indian Cove area would be realigned and reconstructed to the 26 foot width at a dangerous curve.

Environmental consequences of these actions include: A total of 244 Joshua trees would be affected by the road reconstruction in this alternative. Of these, 124 trees, 52 of which are large individuals, would not be expected to survive. The remaining 125 trees would be mitigated in place or transplanted with a tree spade and expected to survive. The greatest impact on the Joshua trees occurs in segment 6; impacts on the Joshua trees have been eliminated in segments 2 and 7. Planting of nursery Joshua tree stock in areas disturbed by this project is a significant mitigating measure. The seed for these trees was collected within the monument so all Joshua trees lost will be replaced – although at a drastically reduced size. It will take hundreds of years for these trees to attain the size of the removed trees. Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species. Other species affected by the realignment which are salvageable include Mojave Yuccas (75 individuals), Parry's Nolina (1 individual), and various cacti (275 individuals). Additionally, 87 large

junipers along Route 13 will be saved through maintaining the same roadway width and alignment for this route.

The current visitor experience, of driving through a desert forest on a narrow road, will be maintained by: making 4.0 miles of Route 12 (segment 2) and all 5.0 miles of the Queen Valley Road (segment 5) a one-way road; and maintaining the same roadway width and alignment and restricting large vehicles from Route 13. Visitor inconvenience resulting from the one-way flow of traffic include: vehicles traveling from east to west would have to go an additional 3.25 miles to get to Ryan Campground; and vehicles proceeding from points immediately east of Ryan Campground to Keys View, a popular overlook, would have to make an easterly loop on Route 12, an additional 10 miles.

Visitor experience will change by paving the Queen Valley road and converting it to one way. Paving will improve the experience for those visitors who would not normally drive the existing dirt road. Paving, along with the increase in visitor use it will likely bring, will however detract from the experience of those visitors who prefer the rustic appeal of a lightly used dirt road. The one way system will also detract from the ability of rock climbers to move between sites as easily as they currently do. To mitigate this impact a "hardened" route system will be developed. The visitor experience of driving through a desert forest on a narrow road would be lost by widening of road segments 1, 3, 4, and 6 (5.70 miles).

Visitor safety will improve since all roads will provide adequate width and proper alignment to accommodate modern vehicles. Driving speed may actually decrease because the road would be recognized as a tour road rather than a destination route which discourages through traffic. In summary, the number of accidents, serious injuries, and fatalities should all be substantially reduced from the no action alternative.

Widening and realigning segments 1, 3, 4, 5, and 6 will result in the loss of 13.3 acres of potential desert tortoise habitat along the road shoulders. To mitigate construction impacts on the threatened desert tortoise, surveys will be conducted of active construction areas. If tortoises are discovered mitigation techniques approved by the USFWS will be employed. With this mitigation and the small area of potential desert tortoise habitat involved (most of this acreage is in areas of low relative tortoise density), this alternative is unlikely to have an adverse effect on the species.

All highway reconstruction and realignments have been planned to avoid impacting known cultural resource sites. In the event that new sites are discovered during construction, design will be accomplished in such a way as to avoid impacts to the sites. If it is not feasible to avoid impacts, mitigating measures will be developed in consultation with the appropriate cultural resource agencies.

Alternative B objectives are to:

- Protect the maximum number of Joshua trees along the road reconstruction corridor.

- Maintain the existing visitor experience along these routes by maintaining a narrow road corridor.

Actions proposed to achieve these objectives include: modifications to Route 12 road segments 1, 3, 4, and 6. The remaining road segments would be treated the same as in Alternative A. Segments 1 and 6, would remain open to two way traffic and be reconstructed to a narrower top width (22 feet).

Segments 3 and 4 would become part of a 14 foot wide one way loop going east. Routes 13 and 112 would be treated the same as in alternative A in this alternative.

Environmental consequences of these actions include: A total of 177 Joshua trees, the least of all the action alternatives, would be affected by the road reconstruction in this alternative. Of these, 74 trees, 22 of which are large individuals, would not be expected to survive. The remaining 103 trees would be mitigated in place or transplanted with a tree spade and expected to survive.The greatest impact on the Joshua trees occurs in segment 6. Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species. Other species affected by the realignment which are salvageable include Mojave Yuccas (45 individuals), Parry's Nolina (1 individual), and various cacti (220 individuals). Additionally, 87 large junipers along Route 13 will be saved through maintaining the same roadway alignment for this route.

The current visitor experience, of driving through a desert forest on a narrow road, will be maintained by making 6.25 miles of Route 12 (segments 2, 3, 4) a one-way road, and maintaining the narrow width of segments 1, 6, and 7. On the one way routes, the experience will be more relaxing since visitors can spend more time enjoying the scenery and forget about oncoming traffic. Paving the Queen Valley road and converting it to one-way would change the visitor experience in the same manner as described in alternative A.

As in alternative A, visitor inconvenience will result from the one way routes. Since the one-way sections in this alternative are longer than in alternative A, it poses more inconveniences for visitors. To mitigate this impact, the "hardened" route mitigation of alternative A would also apply here. Three possible problems will occur with one-way flow of traffic: vehicles traveling from east to west would have to go an additional 1.75 miles to get to Keys View; vehicles proceeding from Keys View to the west entrance would have to make an easterly loop on Route 12, an additional 7.75 miles; users of Ryan campground would have to travel an additional 10.75 miles to Keys View, and an additional 9 miles to the west entrance.

Realigning segments 1, 5, and 6 will result in the loss of 7.9 acres of potential desert tortoise habitat along the road shoulders. Mitigation of construction impacts would be the same as in alternative A. The amount of potential desert tortoise habitat affected in this alternative is less than in alternative A so the same conclusion i.e. no adverse affect on the species is anticipated.

This alternative would have similar effects on cultural resources as in alternative A. Such effects would however be less than in alternative A since less area would be altered.

Alternative C objectives are to:

- Provide for visitor safety and convenient access to features of interest.

- Reduce road maintenance expenses.

Actions proposed to achieve these objectives include: leaving all 9.70 miles of Route 12 (segments 1, 2, 3, 4, and 6) open to two-way traffic and widening to 26 feet. The Queen Valley road (segment 5) would remain at its current width and unpaved in this alternative. Route 13 (segment 7) would remain open to two way traffic and be widened to 24 feet. Route 112 would be treated the same as in alternative A in this alternative.

Environmental consequences of these actions include: A total of 716 Joshua trees, the largest of any alternative, would be affected by the road reconstruction in this alternative. Of these, 362 trees, 194 of which are large individuals, would not be expected to survive. The remaining 354 trees would be mitigated in place or transplanted with a tree spade and expected to survive. The greatest impact on the Joshua trees occurs in segments 2 and 7. Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species. Other species affected by the realignment which are salvageable include Mojave Yuccas (170 individuals), Parry's Nolina (1 individual), and various cacti (575 individuals). Additionally, 154 large junipers were noted along both routes and approximately 40-55 of these trees may be saved through mitigation or transplanting.

Since all road segments would be widened, the current visitor experience, of driving through a desert forest on a narrow road, will be lost in this alternative.

Widening and realigning segments 1, 2, 3, 4, 6, and 7 will result in the loss of 26.3 acres of potential desert tortoise habitat along the road shoulders. Mitigation of construction impacts on the threatened desert tortoise would be the same as in alternative A. Although this alternative affects the largest acreage of potential desert tortoise habitat, the amount of acreage affected (26.3 acres) is not significantly different from the other two alternatives (16.3, and 11.7 acres respectively). So the same conclusion of no adverse impact on the species is reached for this alternative.

This alternative would have similar effects on cultural resources as in alternative A. Such effects would however be increased since a larger area would be altered in this alternative.

Other Alternatives Considered But Rejected such as additional road width options not included in the alternatives is included in Appendix A. The appendix lists all widths considered for each of the seven segments of road as well as the effect of each width on the Joshua trees. Relocation of the Ryan Campground access road was considered in alternative B but was rejected due to unacceptable impacts on the Joshua trees.

ASSOCIATED VISITOR USE AREAS

The associated visitor use areas, like the roads, are no longer adequate to serve current visitation levels and patterns. Visitation type, level, and location have changed dramatically during the past decade. Designated parking areas are currently improperly sized and located to handle peak season use. As a result, visitors are parking in nearby areas (designated for other attractions or functions) or on the roadside and walking back cross country to the site they want to visit. This creates two problems: expanding bare spots at the pavement edges of roadways and parking areas which have no barriers to prevent such activities; and social "trailing" across natural desert terrain damaging native vegetation, soils, and visual quality. Designated parking currently provides for only one third of the peak season use with unnecessary, uncontrolled, and continually expanding damage to resources the monument was originally established to protect. For example, In the Wonderland of Rocks (Hidden Valley), Ryan Mountain area designated parking capacity is currently 186 cars and 17 RVs. Peak season use is 529 cars and 46 Rvs.

Alternatives Considered and Their Environmental Impacts

Three alternatives are considered for the Associated Visitor Use Areas: No action which would make no improvements except for routine maintenance; alternative A, the preferred alternative, which uses a combination of paving existing and new parking areas and "hardening" trails to concentrate visitor use, reduce resource impact, and raise the designated parking capacity substantially; and alternative B, which takes a more conservative approach to resource protection by increasing designated parking to a lesser degree than in alternative A, and limiting such parking primarily to existing disturbed areas.

As with the alternatives for the roadway, each of these alternatives seeks to fulfill the monument's purpose and management objectives, but, since each has a different emphasis, each has different objectives. The preferred alternative (A) was developed by evaluating existing visitor use patterns, locations of popular areas, and peak season use. **Peak season use** was calculated from a windshield estimate of cars parked within the area, in designated parking areas and on road shoulders, during heavy spring use periods, normally the highest visitation period. In order to minimize the visual intrusion from large parking lots going unused for most of the year, 80% of the heavy use figures were used to determine parking capacities in alternative A. A description of each alternative and its' environmental consequences follows.

The No Action Alternative objective is to act as a control in order to provide a comparison with the other actions being considered.

To achieve this objective, no modifications would be made to existing areas. All areas would continue to be maintained and repaired on an "as needed" basis, but no substantial improvements would take place and no new areas would be added.

Native vegetation occurring at the edge of poorly defined parking areas would continue to be trampled by visitors driving off the pavement to park. Such vegetation losses amount to approximately .1 acres and one or two Joshua trees per year. Designated parking capacity would remain at 329 cars and 21 RVs or approximately 1/3 of the peak season use. Visitor experience would continue unchanged but convenience and safety, lack of adequate parking, lack of orientation, and substandard restroom facilities would continue to be major concerns.

Alternative A (Preferred) objectives are:

For the roadway corridor and **all** associated visitor use areas:

- To provide adequate parking (based on existing use) properly located to serve the needs of all appropriate visitor activities.
- To control damage to resources from driving and parking in undesignated areas and "trailing" to popular sites.
- To minimize disturbance to resources (specifically Joshua trees, rock outcrops, drainages, cultural resources) from new construction.
- To maximize use of existing disturbed areas, where feasible.

- To restore previously impacted sites, where possible.

- To provide site design guidelines – rock barriers, curbing, comfort stations, fencing, etc.

- To provide a coordinated interpretive plan which will help accomplish the monuments' purpose of providing visitors the opportunity to experience and understand monument resources.

- To simplify parking and roadway turning movements.

Actions proposed to achieve these objectives include: a combination of related projects to: improve visitor safety and reduce maintenance costs; provide orientation for visitors as well as rock climber viewpoints; provide adequate parking for cars, RVs, and buses in carefully located designated areas; and improve the visitor experience and visual quality of the area as it relates to site furniture (comfort stations, trash receptacles, barriers, etc.).

Environmental consequences of these actions include: A total of 113 Joshua trees, the largest of any alternative would be affected by parking area construction in this alternative. Of these, 57 trees would not be expected to survive. The remaining 66 trees would be transplanted with a tree spade and expected to survive. The net effect of visitation on native vegetation should be substantially reduced as a result of confining driving, parking, and hiking to designated areas, which have been adequately sized and located to meet the demand.

The designated parking capacity will increase from 329 cars and 21 RVs to 825 cars and 161 RVs or roughly equal to the current peak visitation. This represents an increase in designated parking capacity of 156% for cars and 700% for RVs. Visitor safety will improve through better orientation and by providing well defined parking areas which will reduce the number of informal pullouts and potential accident locations. Paved areas with well defined spaces will allow a smaller area to be used more efficiently to provide more parking. Park management and maintenance expenses will also decline with the better defined and more logically arranged visitor use areas.

The visual quality of the visitor experience will improve by: providing site furniture and comfort stations designed to blend into the natural setting; clearing up the present clutter of vehicles parked haphazardly; and providing a well defined edge between the parking areas and the natural environment. While these changes will improve visual quality, the dusty dirt road rustic experience which appeals to some visitors will be lost in these areas. That experience will still be available in other areas of the monument.

Although the associated visitor use areas occur within threatened desert tortoise habitat there may not be any tortoises within these areas and the immediately adjacent terrain. This may be a result of tortoises relocating themselves out of the area due to the disturbance of visitors or of those tortoises inhabiting areas adjacent to traffic ways being killed by vehicles. So even though the associated visitor use areas occur within tortoise habitat these areas may not provide actual habitat and may not contain any tortoises. That is why the term potential tortoise habitat is used in the following discussions.

Construction of facilities in the associated visitor use areas will result in the loss of 11.34 acres of potential tortoise habitat. Restoration of 1.60 acres of terrain will also occur leaving a net loss of 9.74

acres of potential tortoise habitat. To mitigate construction impacts on the tortoise, surveys will be conducted of active construction areas. If tortoises are discovered mitigation techniques approved by the USFWS will be employed. With this mitigation and since there is only a small amount of potential habitat involved and most of this acreage is in areas of low tortoise density, this alternative is unlikely to have an adverse affect on the desert tortoise.

This alternative would have the same effects on cultural resources as in alternative A, roadway section.

Alternative B objectives are the same as alternative A except for the first objective which would not apply and be replaced by the following:

- To provide for parking **primarily** in existing designated areas by paving and striping these areas.

This alternative is similar to alternative A in that it seeks to control resource damage through proper planning and location of parking facilities. The main difference is that resource damage would be controlled by limiting visitation to the levels that could be accommodated **primarily** by paving over existing designated parking areas.

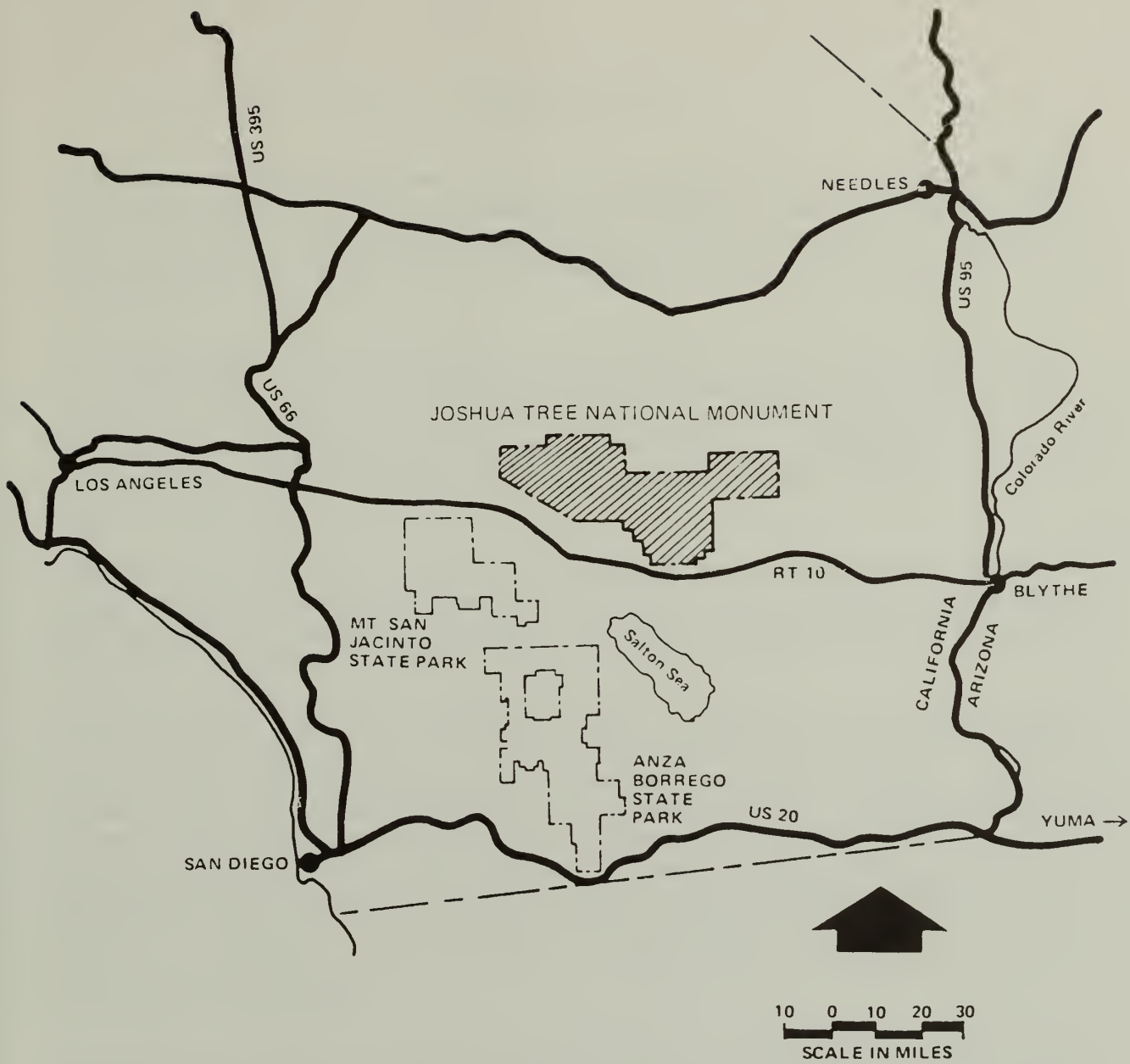
Actions proposed to achieve these objectives include: the same actions proposed in alternative A would be pursued but in fewer areas and to accommodate lower levels of visitation. Differences in the two alternatives are shown in the parking area comparison chart located in the first part of the Associated Visitor Use Areas section.

Environmental consequences of these actions include: A total of 66 Joshua trees would be affected by parking area construction in this alternative. Of these, 44 trees would not be expected to survive. The remaining 22 trees would be transplanted with a tree spade and expected to survive. The net effect of visitation on native vegetation should be reduced from confining driving, parking, and hiking to designated areas. However, since these parking areas are sized lower and are not located to serve all popular visitor use areas, a substantial amount of unauthorized parking and "trailing" can be expected to continue.

All impacts on visitors will be the same as in alternative A with the following exceptions: The designated parking capacity will increase from 329 cars and 21 RVs to 497 cars and 119 RVs which represents an increase in designated parking capacity of 54% for cars and 500% for RVs. Park management and maintenance expenses will decline with the better defined and more logically arranged visitor use areas but probably not to the same degree as in alternative A, since this alternative is under peak season use.

Construction of facilities in the associated visitor use areas will result in the loss of 6.61 acres of potential tortoise habitat. Restoration of 2.15 acres of terrain will also occur leaving a net loss of 4.46 acres of potential tortoise habitat. Mitigation of construction impacts would be the same as in alternative A. With this mitigation and since there is only a small amount of potential habitat involved (6.61 acres) and most of this acreage is in areas of low tortoise density, this alternative is unlikely to have an adverse affect on the desert tortoise.

This alternative would have the same effects on cultural resources as in alternative A, roadway section.



THE REGION

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

156 | 40007
DSC | MAY 1984

INTRODUCTION

Joshua Tree National Monument was established by Presidential Proclamation No. 2193 on August 10, 1936, (50 Stat. 1760) because its "lands contain historic and prehistoric structures and have situated thereon various objects of historic and scientific interest; " therefore "it appears that it would be in the public interest to reserve such lands as a national monument, to be known as the Joshua Tree National Monument . . ."

This enabling legislation made Joshua Tree National Monument a unit of the National Park System. The general statutes that guide National Park Service land management are applicable at Joshua Tree National Monument. Among the most important of these are the National Park Service Organic Act (16 U.S.C. sec 1 et seq.) and the Act for Administration (16 U.S.C. 1a-1). These two acts give the Secretary of the Interior the authority to promulgate rules and regulations to effectively manage the National Park System.

Through the National Park Service Organic Act, Congress set forth the purpose of the National Park System which is: "To conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and such means as will leave them unimpaired for the enjoyment of future generations..." (16 U.S.C. sec 1).

In March 1984, the monument was established as part of a Biosphere Reserve which includes Joshua Tree and Death Valley National Monuments; Anza Borrego State Park; Center Of The Mountain Wildlife Management Area; and the Deep Canyon Research Center. Biosphere Reserves are set aside by the United Nations Man and The Biosphere Program (MAB), which is an international program of scientific cooperation dealing with human/environmental interactions throughout all geographic and climatic areas in the world. As of 1987, there were 261 biosphere reserves in 70 countries, 45 in the United States and eight in Mexico. The purpose of these Biosphere Reserves is to establish a network of protected samples of the world's major ecosystem types. Each reserve is devoted to the conservation of nature and scientific research and provides a standard against which human impact on the environment can be measured.

On October 20, 1976, Public Law 94-567 designated 422,320 acres as wilderness and 30,740 acres as potential wilderness additions within the monument. Wilderness is an area "...where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain . . ." and ". . . which is protected and managed so as to preserve its natural conditions . . ." Approximately 80 percent of the monument is designated as wilderness, and management of this area must comply with the Wilderness Act of 1964 and NPS wilderness management policies. National Park Service Management Policies state "Wherever a wilderness area is designated within a park, the preservation of wilderness character and resources becomes an additional statutory purpose of the park."

National Park Service policies require that a unit of the National Park System develop and implement a General Management Plan (GMP). The purpose of the GMP (which was initiated for the monument in 1989) is to set forth the basic management philosophy for the monument and provide the strategies for addressing issues and achieving identified management objectives.

The GMP begins by defining the purpose of the monument, identifying significant resources, and developing management objectives to help achieve the purpose and protect significant resources. The following sections were developed during the GMP process and represent current NPS thinking on the purpose, significant resources, and management objectives for the monument.

MONUMENT PURPOSE

Monument purpose is defined as the reason for its establishment and management as an NPS area. As described in the previous section, the monument has three distinctly different (although compatible) designated reasons for its existence.

Based on the enabling legislation, Biosphere Reserve, NPS, and Wilderness designations, the following purpose was identified for Joshua Tree National Monument:

- Preserve the biologically diverse examples of Mojave and Colorado Desert ecosystems and provide visitors the opportunity to experience and understand them.

- Preserve and interpret the prehistoric and historic sites, structures, and objects within the monument and provide visitors the opportunity to experience and understand them.

- Serve as a natural laboratory for understanding and managing Mojave and Colorado Desert ecosystems.

- Serve as a baseline indicator against which environmental changes can be identified.

- Preserve for future use and enjoyment the character and values of designated wilderness within the monument.

SIGNIFICANT RESOURCE VALUES OF JOSHUA TREE NATIONAL MONUMENT

Resource significance is based on the inherent natural and cultural values and the opportunities for education and enjoyment they provide. Significance helps to determine the primary visitor experience and identifies resource management, visitor use, and interpretive priorities.

Natural Resources

The monument contains unique plant and animal associations that are pristine examples of the biologically diverse Mojave and Colorado Desert ecosystems.

The monument contains the largest protected population of mature Joshua trees known to exist on earth.

In its 560,000 acres, the monument contains 422,320 acres of legislated wilderness that are protected from future human alteration. In addition, 30,740 acres are potential wilderness and will become wilderness when non-conforming uses are no longer present.

The unique east-west transversing mountain ranges and their topographic relief support examples of Mojave and Colorado Desert ecosystems.

The unique compressed transition zone between the two deserts provides the opportunity to traverse from one desert to the other within a short distance.

The monument is the northernmost location for the natural California fan palm oasis and has stands of Joshua trees and junipers noteworthy for their age and size.

Clean air, extended visual range, topographic relief, massive boulders and rock outcrops, and desert plant life combine to make the monument an outstanding scenic resource.

Cultural Resources

The monument contains remains of early Pinto culture and other prehistoric and historic native American cultures, Euro-American gold mining, and subsistence cattle ranching that illustrate the different adaptations people made to the harsh desert environment.

The monument curates one of the most significant archeological collections of native American artifacts of the southern California desert (the Campbell Collection).

Recreational Resources

The monument contains the only legislatively designated wilderness within the California desert.

The expansive landscape of desert wilderness provides outstanding opportunities to experience solitude, naturalness, and primitive recreation.

The monument provides some of the best, extended season and diverse desert, wild-flower displays in the southwestern United States.

Topographic relief and the associated change in air temperature related to elevation extends the visitor use to a year-round season.

Massive boulders and rock outcroppings provide some of the best rock climbing opportunities in the United States and the world.

Road corridors within the monument have been in use since historic time, allowing modern visitors the opportunity to see the monument as it has historically been seen.

MANAGEMENT OBJECTIVES

Management objectives, listed in the Statement for Management (1978), were developed to help achieve the original purpose of the monument.

Ensure that enough of the Mojave and Colorado Desert ecosystems are protected that they remain self-sustaining.

Preserve the functional integrity of the Mojave and Colorado Desert ecosystems by mitigating human disturbances within the park boundary.

Preserve the significant prehistoric and historic features and sites associated with cultural occupations, adaptations, and use of desert ecosystems.

Provide for a diverse visitor experience including recreational and educational activities related to desert ecosystem resources and cultural features and sites.

PURPOSE OF AND NEED FOR THE ACTION

INTRODUCTION

In 1984, the NPS prepared a Transportation Study/Road System Evaluation for Joshua Tree National Monument. That study was developed in response to the Surface Transportation Assistance Act of 1982 (P.L. 97-424; 23 USC 202), which addressed the nationwide need for rehabilitation and upgrading of deteriorating public roads. The funding authorized by this act has enabled the NPS to implement a multiyear program – the Federal Lands Highway Program (FLHP) – for phased improvement of individual park road systems.

As part of the FLHP, the NPS in coordination with the Federal Highway Administration (FHWA) is currently upgrading and improving the roadway system in Joshua Tree National Monument. The 1984 transportation study identified the serious roadway deficiencies within the monument and proposed solutions in a prioritized listing. Several roadways have already been improved to meet the National Park Road Standards (1984). Several others, however, are still deteriorating as a result of vehicle use for which they were not designed.

NPS objectives in improving the road system are to:

- reduce or eliminate impacts on monument resources,
- increase visitor safety,
- maintain or enhance the visitor experience.

In 1987, a 6.5 mile section was completed immediately east of the Geology Tour Road intersection. Presently, 9.7 miles of route 12 and the entire 5.6 miles of the Keys View road (route 13) are scheduled for improvements in the 1990's. These road sections are associated with the seven visitor use areas of the West Entrance, Wonderland of Rocks, Cap Rock, Keys View, Geology Tour Road, Ryan Mountain, and Split Rock/Live Oak (see Vicinity Map on following page).

THE ROADWAY

Park Routes 12 and 13

Route 12 is one of the two principal access park roads into and through Joshua Tree National Monument. It begins at the north boundary near Twentynine Palms and traverses a 25.65 mile path through the monument to the west entrance. Route 13 is a connector road to the Salton Sea overlook at Keys View.

These roadways were originally built by miners to accommodate wagons and teams, and the same basic alignment is followed today. Improvements through the years included widening the roadways, applying dirt palliatives or chip and seal coats, and half-sole patching. After creation of the monument, spur roads to popular use areas were built in the same manner. The sequence of roadway improvements has resulted in a roadway too narrow for present use, an inadequate structural road

base, road alignment and drainage problems, an insufficient number of turnouts and parking areas, and safety hazards (especially for recreational vehicles along curve sections). Magnificent specimens of very large and old Joshua trees grow at the edge of the pavement.

Park Route 112

Route 112 is the only access road into the Indian Cove area of the monument. Realignment of a 0.1 mile segment is required to eliminate the safety hazard on this dangerous curve.

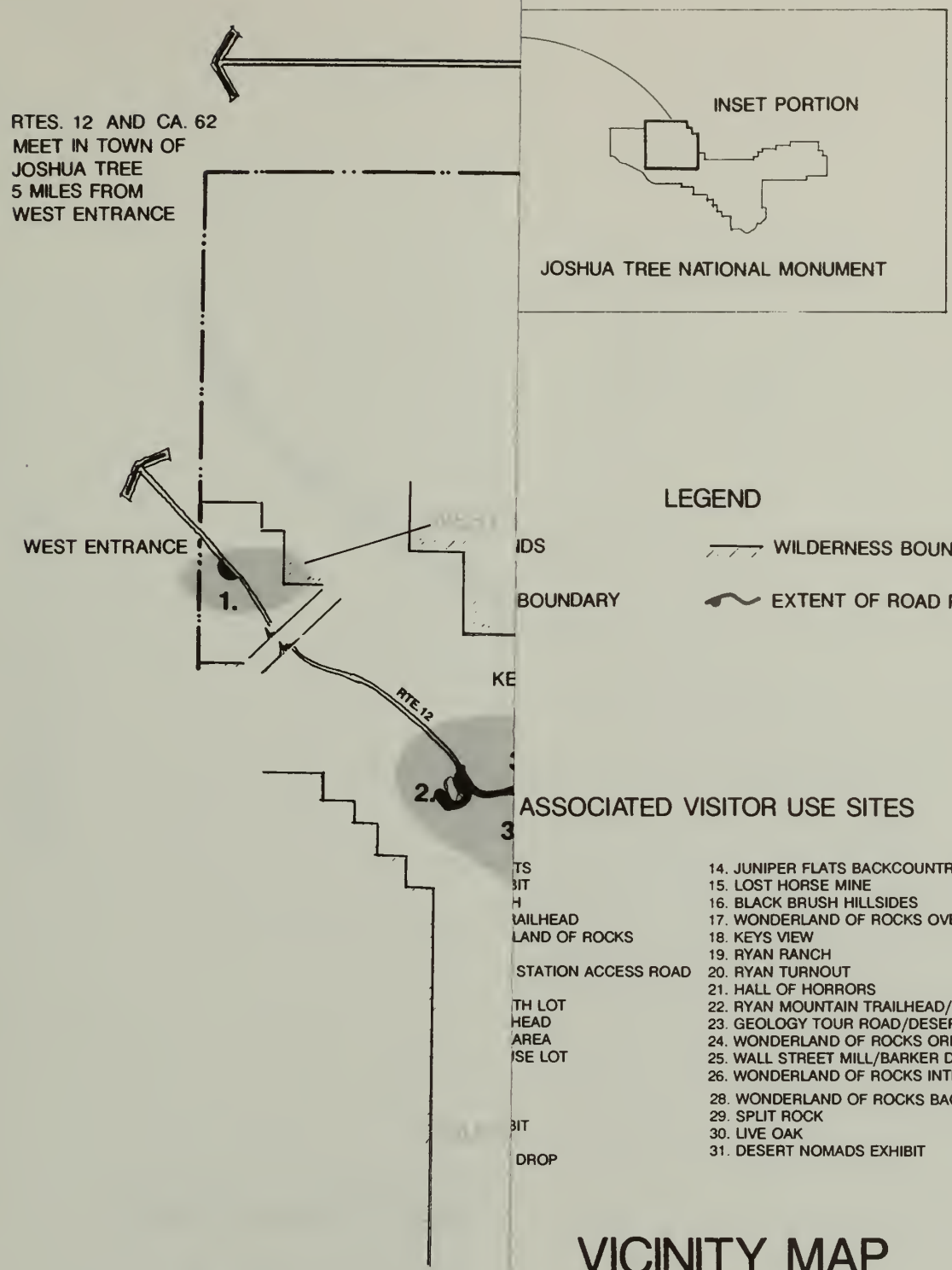
ASSOCIATED VISITOR USE AREAS

The parking areas, like the roads, are no longer adequate to serve current visitation levels and patterns. Visitation type, level, and location have changed dramatically during the past decade (see visitation graph on page 9). Two reasons for this change are the expanding suburban sprawl of Los Angeles to the east bringing the monument within a two hour drive of more than ten million people, and a substantial increase in the popularity of rock climbing as a recreational sport and the discovery of the monument as an excellent place to pursue this activity. Designated parking areas are currently too small to accommodate the recent increase in use, and not located adjacent to the popular attractions (e.g. climbing rocks). As a result, visitors are parking in nearby lots (designated for other attractions or functions) or on the roadside and are walking back cross country to the site they want to visit. As illustrated in the following photographs (pages 11, 12), this creates two problems: expanding bare spots at the pavement edges of roadways and parking areas which have no barriers to prevent such activities, and social trailing across natural desert terrain damaging native vegetation, soils, and visual quality. Designated parking currently provides for only one third of the peak season use (defined in the next paragraph) with unnecessary, uncontrolled, and continually expanding damage to resources the monument was originally established to protect.

Locations of the visitor use areas associated with these two roads are shown on the Vicinity map, page 7. For discussion purposes, individual visitor use sites have been grouped into seven areas (indicated by the large named circles on the vicinity map) sharing similar geographic characteristics. Problems at these seven areas are described in the following sections. In these discussions, "**Peak Season Use**" was calculated by monument staff from a windshield estimate of cars parked within the monument, in designated lots and on road shoulders, during heavy spring use periods, normally the highest visitation period. In order to minimize the visual intrusion from large parking lots going unused for most of the year, 80 percent of the peak season use figures were used to determine parking capacities in alternative A.

West Entrance (vicinity map site 1)

Upon entering the monument from the west, there is no interpretive information for visitors about the environment they are driving through. This area has only one designated parking area for five cars and one RV, with an interpretive panel.



LEGEND

WILDERNESS BOUNDARY

EXTENT OF ROAD PROJECT

ASSOCIATED VISITOR USE SITES

14. JUNIPER FLATS BACKCOUNTRY TRAILHEAD
15. LOST HORSE MINE
16. BLACK BRUSH HILLSIDES
17. WONDERLAND OF ROCKS OVERLOOK
18. KEYS VIEW
19. RYAN RANCH
20. RYAN TURNOUT
21. HALL OF HORRORS
22. RYAN MOUNTAIN TRAILHEAD/INDIAN CAVE EXHIBIT
23. GEOLOGY TOUR ROAD/DESERT QUEEN BACKCOUNTRY
24. WONDERLAND OF ROCKS ORIENTATION-EAST
25. WALL STREET MILL/BARKER DAM
26. WONDERLAND OF ROCKS INTERPRETIVE EXHIBIT
28. WONDERLAND OF ROCKS BACKCOUNTRY STAGING AREA
29. SPLIT ROCK
30. LIVE OAK
31. DESERT NOMADS EXHIBIT

VICINITY MAP

ENT OF ROAD PROJECT AND LOCATION OF ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE

NORTH

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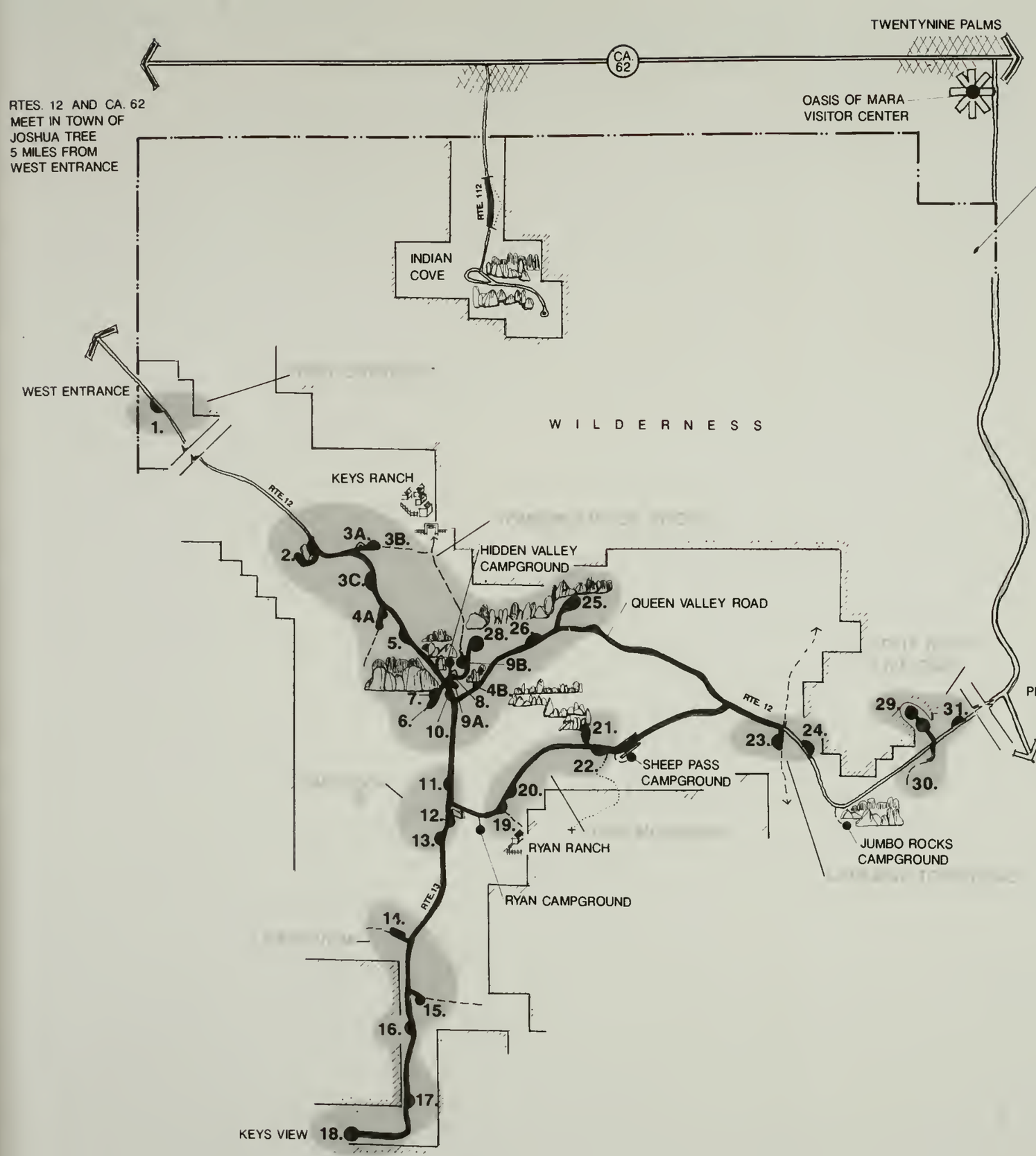

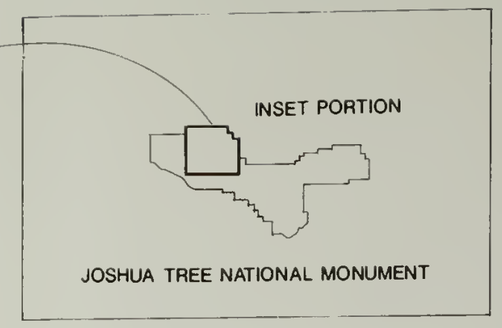

LEGEND

- CAMPGROUNDS
- WILDERNESS BOUNDARY
- MONUMENT BOUNDARY
- EXTENT OF ROAD PROJECT

ASSOCIATED VISITOR USE SITES

1. DESERT ENVIRONMENTS
2. ROCK CLIMBING EXHIBIT
3A. WAIT LOT/KEYS RANCH
3B. BOY SCOUT HIKING TRAILHEAD
3C. ROCK PILES/WONDERLAND OF ROCKS ORIENTATION-WEST
4A. LOST HORSE RANGER STATION ACCESS ROAD
4B. CYCLOPS FORMATION
5. HIDDEN VALLEY - NORTH LOT
6. HIDDEN VALLEY TRAILHEAD
7. TURTLE ROCK PICNIC AREA
B. HIDDEN VALLEY DAY USE LOT
9A. INTERSECTION ROCK
9B. ECHO "Y"
10. ROCK PILE EXHIBIT
11. MOJAVE PLANTS EXHIBIT
12. CAP ROCK
13. GAUGING STATION/RV DROP
14. JUNIPER FLATS BACKCOUNTRY TRAILHEAD
15. LOST HORSE MINE
16. BLACK BRUSH HILLSIDES
17. WONDERLAND OF ROCKS OVERLOOK
1B. KEYS VIEW
19. RYAN RANCH
20. RYAN TURNOUT
21. HALL OF HORRORS
22. RYAN MOUNTAIN TRAILHEAD/INDIAN CAVE EXHIBIT
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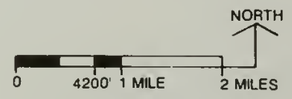
28. WONDERLAND OF ROCKS BACKCOUNTRY STAGING AREA
29. SPLIT ROCK
30. LIVE OAK
31. DESERT NOMADS EXHIBIT

VICINITY MAP

EXTENT OF ROAD PROJECT AND LOCATION OF ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE



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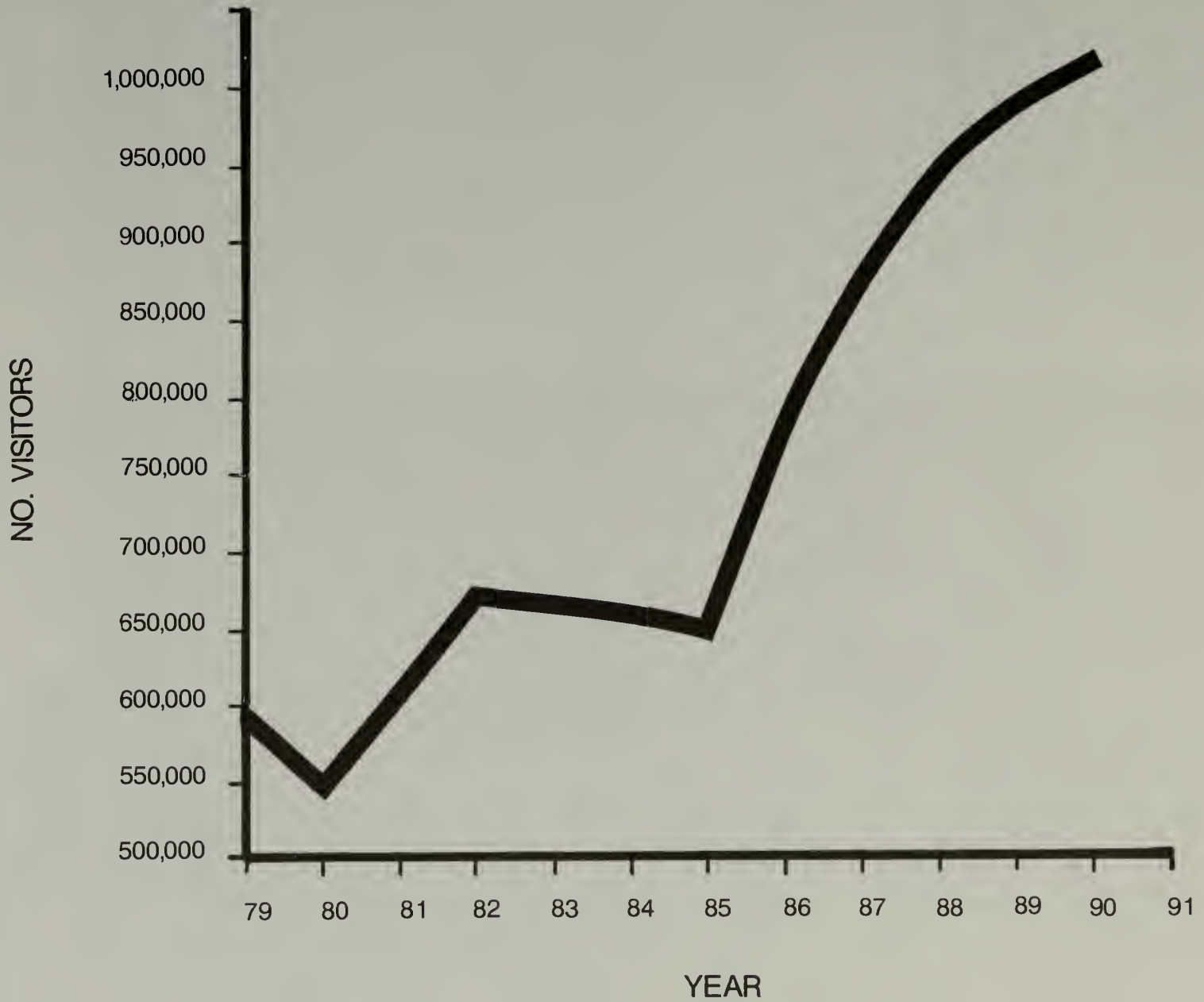
JOSHUA TREE NATIONAL MONUMENT

VISITATION 1979 - 1990



Wonderland of Rocks (vicinity map sites 2-10, 25, 26, 28)

The varied rock formations and native Joshua trees within this area are one of the major visitor attractions to this Mojave Desert portion of the monument. This area consists of 16 separate sites, most of which are located in the Hidden Valley area.

Hidden Valley is considered the principal visitor use area within Joshua Tree National Monument. The developed area includes a campground, picnic areas, and interpretive/hiking trailheads accessed by spur roads from a major intersection along route 12. Area rocks are a haven for climbers, climbing spectators, a popular destination for picnickers and hikers, and as such, accommodate both day and overnight use. This area is highly congested with traffic, and the campground is often full during the peak visitor use season from October to May. There are no orientation signs prior to the intersection, making way finding difficult. Parking is scattered throughout the area off road shoulders and adjacent to rock outcrops. Lime green and tan portable comfort stations and tan dumpsters are located in the parking areas throughout Hidden Valley. They are visually incompatible with the park setting, negatively impacting visitor experience due to unpleasant odors.

Designated parking capacity of this area is currently 186 cars and 17 RVs. Peak season use is 430 cars and 37 Rvs.

Cap Rock (vicinity map sites 11-13)

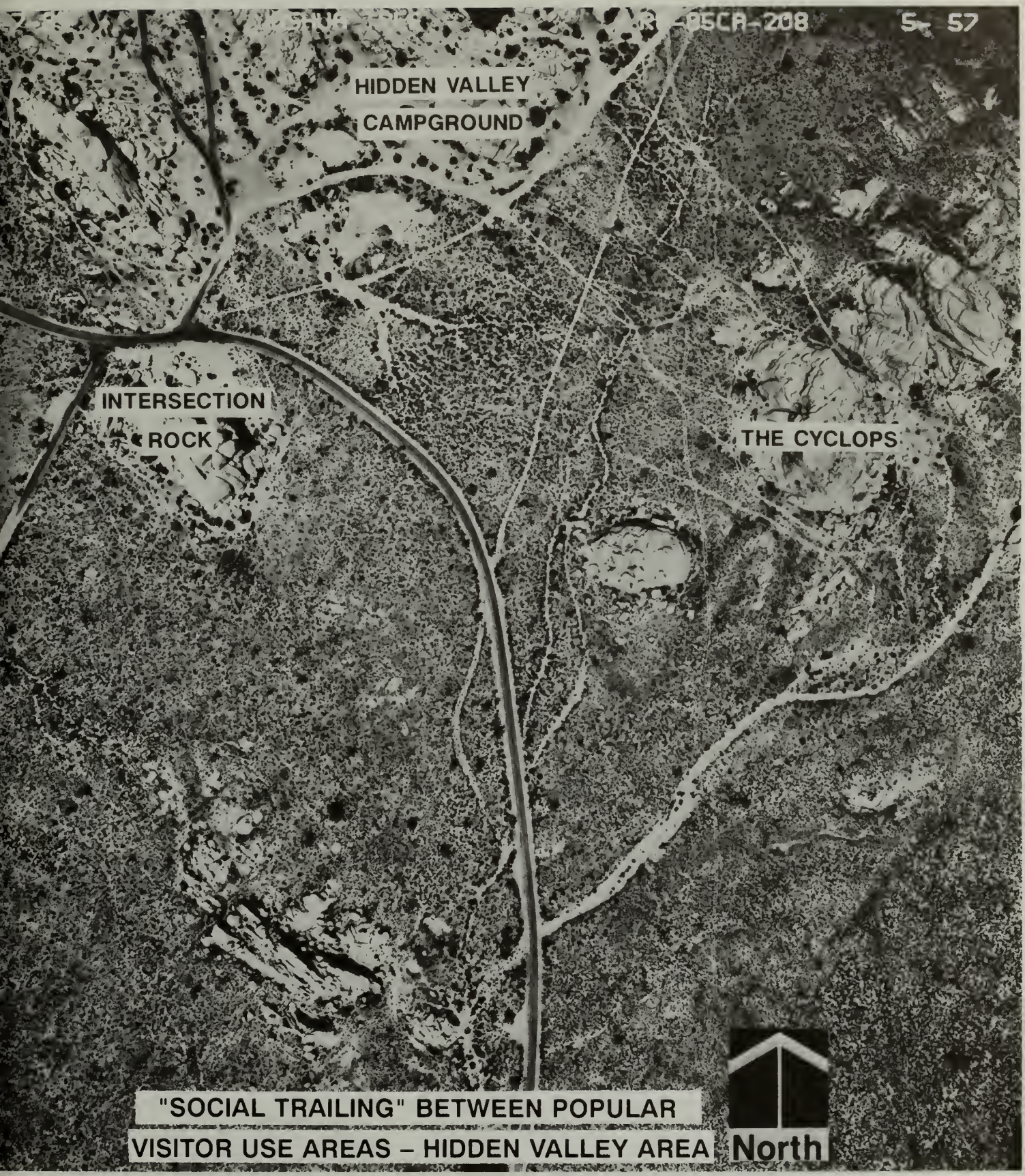
Cap Rock is the principal attraction in this area of three sites. The Cap Rock parking area/trailhead is located along route 13 south of Hidden Valley. Development consists of an informal gravel parking lot with trailhead signing and a vault toilet. The Cap Rock formation is a popular bouldering area for climbers. The interpretive loop is one of the few paved barrier-free trails in the monument. The parking area lacks edge and parking space definition. Vehicles park haphazardly which limits parking capacity.

Designated parking capacity of this area is currently 15 cars and 2 RVs. Peak season use is 25 cars and 2 Rvs.

Keys View (vicinity map sites 14-18)

This area consists of five sites along the Keys View road (Route 13). The Keys View Overlook and pedestrian interpretive loop trail which is located at the end of route 13 is the principal attraction. Barrier-free access is provided to a three-foot-wide sidewalk bordered by a low wall. The interpretive trail is available for use but is not barrier-free because of steep grades, steps, and broken pavement surface. During smog free days, there is a commanding view of the Coachella Valley, Santa Rosa Mountains,and Salton Sea from the sidewalk as well as from the interpretive trail overlook. However, the sidewalk is too narrow to accommodate two-way pedestrian/wheelchair traffic. The interpretive trail is in poor condition and needs reconstruction or repaving.

Designated parking capacity of this area is currently 64 cars and 2 RVs. Peak season use far exceeds present designated parking capacity.



"SOCIAL TRAILING" BETWEEN POPULAR VISITOR USE AREAS – HIDDEN VALLEY AREA

INFORMAL EXPANSION OF PARKING AREAS CAUSED BY USE EXCEEDING CAPACITY

Ryan Mountain (vicinity map sites 19-23)

Ryan Mountain dominates the five sites within this area. The mountain is accessible by a 1.5 mile trail to the 5461 foot summit, offers several lookout points with fine views of Queen, Lost Horse, Hidden, and Pleasant Valleys. The area, popular with climbers and hikers, is located along route 12 east of the Keys View turnoff. Parking is scattered throughout the area off road shoulders and adjacent to popular rock climbing outcrops. Development consists of a turnout, several trailhead/climbing parking areas, and a 27-site campground.

Designated parking capacity of this area is currently 38 cars and 6 RVs. Peak season use is 99 cars and 9 Rvs.

Geology Tour Road (vicinity map sites 23, 24)

The Geology Tour Road, two sites, is an 18-mile self-guiding motor nature tour along a dirt road that winds through some of the monument's most fascinating landscape. It is located along route 12 at the eastern end of the road corridor within this project. Parking, for visitors to pick up an interpretive tour guide, is in two ill-defined pullouts at the beginning of the road.

Designated parking capacity of this area is currently 5 cars and 2 RVs. Peak season use far exceeds this designated capacity.

Split Rock/Live Oak (vicinity map sites 29-31)

This area consists of three sites. Split Rock is reached via a short paved road on the north side of route 12 at the eastern end of the project area. A huge boulder cleft neatly in two gives this picnic area its name. Development consists of a small parking area and several picnic tables. The parking area lacks edge definition and vehicles park haphazardly. Live Oak picnic area is reached by a short dirt road south from route 12. This picnic area needs parking definition to protect from further vehicular intrusion into the natural desert vegetation.

Designated parking capacity of this area is currently 23 cars and no RVs. Peak season use far exceeds this designated capacity.

PROJECT PURPOSE

The purpose of this environmental assessment is to evaluate alternative solutions to repair and rehabilitate the existing deteriorated roadways, parking in undesignated areas, and other visitor use issues in seven associated visitor use areas in order to:

- Fulfill the monument's purpose and management objectives
- Protect significant resources
- Improve circulation and eliminate safety hazards
- Improve the visitor experience and visual quality

- Reduce maintenance requirements

Actions to address the issues and fulfill management objectives will be developed as several alternative management approaches. Since preservation is the original reason for establishment of the monument, the preferred alternative will have a strong resource protection strategy for both the roadway and the associated visitor use areas.

INTERRELATIONSHIPS WITH OTHER PLANS AND PROPOSALS

General Management Plan (GMP)

As discussed in the Introduction, a GMP was initiated for the monument in 1989. This plan sets forth the basic management philosophy for the monument and provides the strategies for addressing issues and achieving management objectives. It presents long range strategies for management of natural and cultural resources and providing appropriate visitor use and interpretation of those resources. Based on these strategies, programs, actions and support facilities needed for monument operations and visitor use are identified.

The major difference between this plan and the GMP is timeframe. The GMP looks at the long term issues that will affect the future of the monument such as: future levels of visitation and what levels are appropriate to allow visitors to understand and enjoy the monument without damaging its resources. To accomplish this, studies may be needed to evaluate the effects of current levels of visitation on park resources and whether there are ways to allow visitation to continue, expand, or decrease in order to protect resources. The current roadway plan described in this document has a much shorter time frame. It looks at controlling resource damage by providing adequate roadways and parking areas to accommodate existing levels of visitation.

The GMP is in its early stages of development and is not expected to be available for public review for 1-2 years. Nothing in the preferred alternative described in this environmental assessment will conflict significantly with proposals in the GMP.

Trails Plan

Changes in visitor use patterns and parking lots to accommodate uses proposed in this plan will require development of a trails plan which will allow visitors convenient access to all areas.

AFFECTED ENVIRONMENT

This section is divided into eight topics that describe the environment of the project area within Joshua Tree National Monument. Although most topics describe environmental components in this area, only those which could be affected by the project are considered further in the section on Environmental Consequences. Those topics are: Vegetation; Desert Tortoise; Visitor Experience, Park Management, and Safety; and Cultural Resources.

GEOLOGY, SOILS, TOPOGRAPHY

The monument consists of low, generally northwest-trending mountains interspersed with intermontane valleys. The underlying geology of the project area is primarily basalt and quartz materials. The roadway corridor passes through crystalline rock terrain which is typical of formations in the monument.

The soils along the project route are decomposed granite and sand and are not rare or unique. These soils are readily moved by wind and water unless vegetation exists. Erosion in the area is readily apparent, and natural revegetation occurs at a very slow rate.

The area consists of rolling terrain in the Mojave Desert ecosystem. The roadway gradients are moderate along the routes with elevations ranging from approximately 4,000 feet at the western end of the project area on route 12, to nearly 4,400 feet at Hidden Valley campground, and approximately 5,200 feet at Keys View. The roadway traverses a path through the Mojave desert over flat to rolling terrain.

HYDROLOGY, FLOODPLAINS, WATER RESOURCES

The hydrological nature of the area is simply that of groundwater following the zones of least resistance along the deeply fractured rock masses and deep loose gravels. There are no known water tables near the surface along the project route, and potable water must be brought from outside sources. The Lost Horse well provides water for the Lost Horse ranger station and residence.

The roadway is subject to sheet flows of water crossing the pavement along the route; several wash areas are designed as "low water crossings". Although no formal analysis has been done, the associated visitor use areas do not appear to be in major floodplains and seem to be subject to only minor localized flooding. Design of the roadway and visitor use areas has taken these drainage patterns and flood waters into consideration. Additional information may be needed prior to final design.

CLIMATE, AIR QUALITY

The climate in the project area is generally hot and dry. The average annual precipitation (primarily during the winter) ranges from one to seven inches per year. Air temperatures range from the low 70s to near 110 degrees Fahrenheit in midsummer and from the low 20s to low 70s during the winter months of December, January and February.

The monument is designated a Class I area by the Clean Air Act as amended in 1977. This classification allows the least incremental increase in air pollutants. Generally, the air quality is good – depending on the air flows from the Los Angeles basin. Very small quantities of air pollutants are generated within the monument; most reductions in air quality are due to smog from the Los Angeles basin. National Ambient Air Quality standards for ozone have been exceeded in the monument and air pollutant damage to plants has been documented. The scenic vista from Keys View is frequently obscured by air pollution in summer months.

VEGETATION

The Route 12 road corridor traverses a path through the Mojave Desert habitat type. The most conspicuous plants along the roadway are Mojave yucca and Joshua tree. Common shrubs in the area include scrub oak, Mormon tea, cottonthorn, blackbrush, paper bag bush, peach brush, and salt bush. Herbs include jimsonweed and coyote melon and short-lived annuals when adequate rains allow seed germination. Desert willow and cat-claw acacia are some of the most prevalent species in the wash areas.

The Keys View road (Route 13) traverses south from Route 12 through Mojave Desert habitat, but with increasing elevation along the route, the yuccas are replaced by California juniper and pinyon pine.

The Joshua tree (*Yucca brevifolia*) is a fairly common plant at elevations ranging from 2,000 to 5,000 feet in the mojave desert. In fact, its distribution is so closely associated with the mojave that it has been used to define the boundaries of that desert. Although common in the mojave, environmental conditions for the optimum development of Joshua trees seem to be best within the monument. Here, they seem to reach their greatest size. The most significant thing about both routes 12 and 13 is the proximity of native vegetation to the roadway. Magnificent specimens of both Joshua trees and juniper grow immediately adjacent to the roadway (see following photograph).

The population of Joshua trees in the monument has been estimated at approximately 5.5 million. Of these, approximately one third are the large branched trees adjacent to the roadway. The profusion of these large branched trees adjacent to the road raises the question of the influence of the road on the trees. It is well known that one of the most environmentally limiting factors for desert plants is water. Since roads tend to gather and channelize water at their edges, it is possible that these trees have grown larger because of the effect of the road. However, no data exists to prove or disprove this theory. In the absence of such data, and since large trees exist elsewhere in the park away from human influences, it will be assumed that these trees are large due to natural processes.

Vegetation will be evaluated further in the Environmental Consequences section since it involves some of the major impacts of the project.

Center for Arid Lands Restoration

Through previous FLHP projects at the monument, needs, techniques, and facilities have been developed in order to restore disturbed land areas. This road reconstruction project will require revegetation of all areas disturbed by construction activities. Natural re-establishment of vegetation in desert ecosystems takes centuries, if indeed it occurs spontaneously at all; the increased traffic these

JOSHUA TREE - ADJACENT TO ROUTE 12

bare sites often receive as undesignated parking areas and travelways further retards plant establishment. The NPS is mandated to protect the integrity of the biotic communities of the lands in its stewardship. This means that non-native plants must not be introduced into the native vegetation, and that seeds and cuttings for plant propagation must be collected directly from the project site, or as close as possible. This requires intensive and careful collections of small lots of seed from many different sites.

Desert plants have physiological adaptations which make them inherently difficult to propagate. Their seeds have protective mechanisms which must be overcome to induce germination. They have extensive root systems which must be given room to grow. They are quite particular about their growing environment. Many require more than one growing season to reach a size suitable for outplantings onto environmentally harsh sites, with minimal follow-up watering and maintenance. Standard commercial nursery practices, containers, and equipment do not meet the needs of desert plant production.

Although information and expertise abound for the set-up and operation of native plant nurseries, and there are many commercially successful native plant nurseries, few propagate desert plants because of the high costs and low profits returned by these "experimental" crops. As a result of these difficulties and the necessity for production of site-specific materials, the native plants nursery was established at Joshua Tree National Monument in 1985.

The nursery provides plants for a variety of vegetation restoration needs in the monument: vegetation loss and damage from road improvement and realignment projects along the 70 miles of paved roads; visual concealment and eventual restoration of the 200 miles of closed roads included within designated Wilderness Areas and sites heavily compacted by visitor use. Over 60 different plant species have been successfully produced, and approximately 10,000 plants have been used in revegetation of road construction disturbances since 1986. The nursery also maintains an extensive seed bank for current and prospective restoration projects.

Joshua Tree's nursery has also grown plants for Death Valley National Monument, the University of California, Riverside, and Anza-Borrego Desert State Park. Currently, a multi-year agreement is being drafted with Lake Mead National Recreation Area to produce plants for their Federal Highways road reconstruction. In addition to supplying plants, the center provides propagation and restoration information, advice, and expertise to numerous agencies, organizations, groups, and individuals.

WILDLIFE

The most common animal species found along the roadway routes include several mouse and woodrat species, white-tailed antelope ground squirrel, chipmunk, coyote, black-tailed jackrabbit, and two species of foxes. Also found in the area are Gambel's quail, scrub jay, common raven, several wren species, side-blotched lizard, chuckwalla, and several rattlesnake species. Mule deer reside in the pinyon-juniper zone of the monument. The 1976 *Natural Resources Management Plan* gives a complete listing of other species occurring in the monument.

The desert night lizard (*Xantusia vigilis*) occurs within the monument. Since the lizard is a secretive species that primarily lives beneath the fallen branches and dead debris of Yucca species, it may be affected by this project. At one time, this lizard was considered to be extremely rare but now is

regarded as one of the most abundant lizards. Its range includes much of the desert areas in southern California and extends into Nevada, Arizona, and Baja California. Although this range appears extensive, the actual distribution within that area is allopatric, i.e., it occurs in isolated areas. With this type of distribution, it is always a possibility that genetically distinct populations have developed (or are developing) in each of the isolated areas. These isolated areas are primarily associated with the distribution of several species of Yucca including Joshua trees.

Presently, there is no research to confirm or deny the existence of a genetically distinct population of the desert night lizard in the monument. Since Joshua trees are widely and continuously distributed within the monument and since the lizards exist virtually everywhere that Joshua trees occur, it is likely that if a distinct population exists within the monument it is one large population. Since the project area is in the heart of the Joshua tree population in the monument, it is likely that it is in the middle of a large lizard population as well, rather than affecting a distinct population.

To further mitigate the effect of the project, all dead and down Yucca material will be removed and placed out of the project area prior to grading. That same material will be replaced at project conclusion to aid in revegetation. On past road reconstruction efforts in the monument, salvage crews were instructed on the existence and care of lizards encountered. These methods have been successful in the past and will be followed on this project as well. Although some lizards are bound to be lost during the project, these methods should keep such losses to a minimum and no adverse effect on the monument population is anticipated.

ENDANGERED AND THREATENED SPECIES

Section 7 of the Endangered Species Act directs all federal agencies to utilize their authorities in furtherance of the purposes of the act by carrying out programs for the conservation of endangered or threatened species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat.

The U.S. Fish and Wildlife Service (USFWS) was informally consulted in June 1990 with a request for a list of species which may be present in the project area or be affected by the project. A list of one threatened species, the desert tortoise, and several candidate (presently under consideration as endangered or threatened but currently with no legal status) species was received (see Appendix B). Consultations continued over the phone between monument resource management staff and the USFWS as the project developed. Topics discussed included the status of the project as well methods of population surveys and mitigation techniques which may be necessary. The USFWS is also being sent a copy of this document for review.

The road corridor and associated visitor use areas were surveyed for endangered and threatened plant species in May 1989 and June 1991; no such species were encountered. The following candidate species (Category 2, proposed for Federal Listing) occur within the monument (Leary, 1987): *Coryphantha vivipera alversonii, Argythamnia (=Ditaxis) californica, Erigeron parishii,* and *Monardella robisonii* and possibly *Gilia maculata.* Of these, only *Coryphantha vivipera* (Foxtail cactus) was expected within the road corridor area, although the survey did not find any individuals. The foxtail cactus is small (10-20 cm tall) and could easily be missed. Prior to actual construction, a more thorough survey of rocky areas

(the habitat) will be conducted. Since relocation is a well known, and very effective mitigation technique, individuals found will be relocated out of the area.

The perennial root parasite, *Pholisma arenarium* (sand plant), was relatively common along the roadside on a portion of the Geotour road section. This species was previously listed as Category 2 (taxa probably appropriate for listing), but was downgraded to Category 3C (taxa more widespread or abundant than previously believed) in the December 1985 update of the Federal Register.

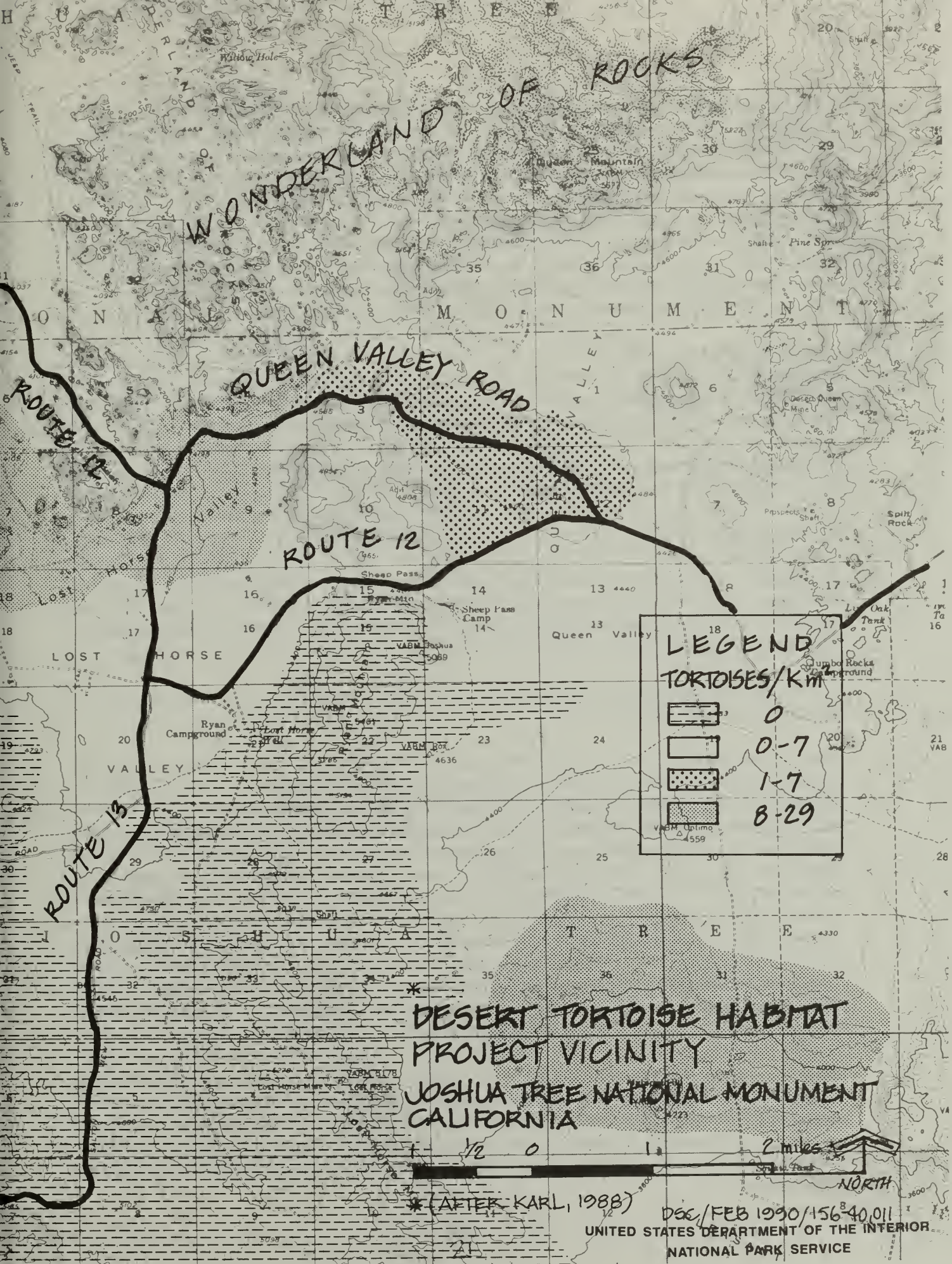
The desert bighorn sheep, protected in California, and the threatened desert tortoise are known to range into the project area. There have also been sightings of the southern bald eagle, California brown pelican, and the American peregrine falcon within the monument boundary, but these species are not known to reside or nest in the monument. These bird species are listed as endangered in the Federal Register.

On August 4, 1989, the USFWS exercised its emergency authority to determine the Mojave population of the desert tortoise (*Gopherus agassizii*) to be an endangered species (Federal Register: 54,149-32326-32331). That ruling was in response to an outbreak of a virulent desert tortoise upper respiratory disease syndrome. This respiratory disease syndrome has caused significant declines in certain tortoise subpopulations and threatens to become pandemic in subpopulations already stressed as a result of habitat degradation, predation, and other factors. On October 13, 1989, the USFWS formally proposed designation of the tortoise as an endangered species (Federal Register: 54,197-42270-42278). On April 2, 1990 the tortoise was officially listed as a "threatened species".

As a result of these rulings, "All current and proposed actions and plans for management of the habitat will require considerations for protection of the tortoise, as required by the Endangered Species Act. Such activities may include, but may not be limited to: grazing, **off-highway-vehicle use**, mining, **construction of developments, and rights-of-way, and activities in tortoise habitat that** kill tortoises and **fragment their habitat**" (emphasis added).

The emergency ruling states that "Tortoises occur in creosote bush, alkali sink, and tree yucca habitats in valleys, on alluvial fans, and in low rolling hills at elevations ranging from 2,000 to 4,000 feet above sea level." Elevations in the project area range from 4,000 feet at the western edge of route 12 to 5185 feet at Keys View. This would seem to place the project area in marginal tortoise habitat. However, as discussed in a recent study of the status of the desert tortoise in the monument, elevation is only one of the factors determining suitable tortoise habitat (Karl 1988). That study investigated the distribution and relative density of desert tortoises in the monument via literature search, ground truthing of habitat, and line transects. The study provided NPS with the background information on tortoises within the monument. Knowledge of the tortoise in the project area was supplemented with two intensive surveys in May 1989 and June 1991.

The Karl (1988) investigation found evidence of tortoises within the project area. The total area of the monument estimated to host tortoises was 252,500 acres (or 47%) with densities ranging from 0-58 tortoises/km^2, possibly reaching a high of 77 tortoises/km^2 in the southern Pinto Basin. Of the seven areas hosting the highest densities in the monument, only Northern Lost Horse Valley is in the project area. The map on the following page depicting tortoise distribution and relative density in the project area was developed from the Karl, 1988 study.


WONDERLAND OF ROCKS
QUEEN VALLEY ROAD
ROUTE 12
ROUTE 62
ROUTE 13
LOST HORSE VALLEY
QUEEN VALLEY
Queen Mountain
Sheep Pass
Sheep Pass Camp
Ryan Campground
Fort Horse Well
Willow Hole
Pine Spr.
Split Rock
Jumbo Rocks Campground
Lost Oak Tank
Spalding Tank
LEGEND
TORTOISES/km²
0
0-7
1-7
8-29
DESERT TORTOISE HABITAT
PROJECT VICINITY
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA
0 1/2 0 1 2 miles
NORTH
*(AFTER KARL, 1988)
DSC/FEB 1990/156-40,011
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Four density classes are shown on the map. According to the study, those areas estimated to have 0-7 tortoises/km probably host a few tortoises, rather than no tortoises, even though no definite tortoise sign was found on these transects. It is also likely that areas estimated to contain 0 tortoises/km have no tortoises except along those edges bordering areas with tortoises.

The Northern Lost Horse Valley, approximately 1800 acres, is estimated to have 8-29 tortoises/km^2. Densities in this area probably approximate the low end of this density category since only one tortoise burrow (south of the Queen Valley Road) was observed and the area is completely surrounded by large areas of low or no tortoises (Karl, 1988). It should be noted that this is a high visitation area due to the rock climbing opportunities and the Hidden Valley Campground.

The amount of tortoise sign in Northern Lost Horse Valley may be an indication that this is a major area that visitors use to release tortoises. (In fact, the study attributed high tortoise densities at the West Entrance to visitor tortoise releases.) Until 1980, this area and the Queen Valley area were both used by the NPS to release tortoises brought to headquarters by visitors. Both factors may be contributing to an unnaturally high tortoise density. Results of the 1989 and 1991 tortoise surveys of the road corridor and all associated visitor use areas seem to indicate that the tortoise density is much lower than reported in the Karl study. During this intensive survey, the only evidence of tortoise discovered in the entire project area was the burrow in the Queen Valley road realignment near Hidden Valley.

Since different alternatives affect different amounts of tortoise habitat, this topic will be treated in the Environmental Consequences section. This environmental assessment will be sent to the USFWS for their review and concurrence with the findings of the evaluation of impacts on Endangered and Threatened Species.

CULTURAL RESOURCES

Cultural Overview

The archeological and historic remains within Joshua Tree National Monument reflect as much as 11,000 years of human use and occupation. In the older Pinto Complex sites, projectile points, milling stones, and other lithic tools indicate that hunting and foraging provided the major source of human subsistence. Later sites suggest development of more specialized technologies and strategies to successfully exploit this desert environment. Mobile groups sought out vegetal foods and small animals in various ecological niches throughout the area, taking advantage of seasonal availability. Ceramics were introduced, and some marginal agriculture may have been pursued. Natural rock features such as rock over-hangs, caves and rockpiles were used for shelter, and foods were stockpiled in ollas in smaller caves and crevices. Water was found in springs, oases, and natural "tanks" or potholes. Sites often were concentrated near water sources. Types of sites include habitations, camps, processing areas, cairns and walls, caches, quarries, bedrock metates, and mortars or grinding stations.

Extensive rock art is found in the monument, including areas east of Cottonwood Spring, south of Fortynine Palms Oasis, near the Desert Queen Mine, at Squaw Tank, Indian Cove, and west of the monument boundary at Coyote Hole. Petroglyphs and pictographs scattered along a northwest-southeast axis through the midsection of the monument suggest a favored prehistoric travel route. North and south of the monument boundaries, major prehistoric trade routes linked the greater

Southwest and the Mojave area with coastal California. Later historic trails ran along many of the same routes.

From the latter part of the prehistoric period until the early 1900s, the following groups lived, hunted and foraged across the Joshua tree area: the Chemehuevi who occupied the eastern portion of the monument; the Serrano, found in the northwestern part (especially Twentynine Palms); and the Cahuilla, occupants of the southwestern portion of the monument. Sites thought to be associated with these peoples include the village (Marah) at Twentynine Palms as well as cremations, camp sites, and artifact scatters. Cahuilla and Serrano groups gather plants within the monument for traditional purposes – traditional foods and medicines. Elders of the Chemehuevi, Cahuills, and Serrano peoples are being contacted to identify sacred sites said to exist in the monument.

Much of the early culture history sequence in southeastern California is poorly understood because geomorphological conditions in the area have produced relatively few buried or stratified sites. There has been a great deal of controversy over "early man" sites in this region. Human adaptation to the desert environment is a recurring research theme, as is interregional contact among groups. Because of its status as a National Monument, Joshua tree's sites have not been disturbed as much as those in adjacent areas.

Other historic sites are associated with mining and ranching. At first, forty-niners bypassed this region for better gold fields along the coast, but during the last quarter of the 1800s and the first third of the 1900s, there was a steady influx of emigrants hoping to make their fortunes in cattle or gold, or both. However, very few earned a reasonable return for their efforts. Segments of old roads, mines, and ranchers' tanks constructed to catch and store water runoff are the most visible reminders of this epoch of history. Present-day roads parallel or overlay historic trails across the monument.

Most of the prehistoric sites in the road corridors postdate A.D. 500; the majority of the historic sites were created after the 1870s.

Within the monument, two oases and seven representative examples of early mining and ranching operations have been nominated and declared eligible for inclusion on the National Register of Historic Places. The Twentynine Palms Oasis (Oasis of Mara) and Cottonwood Oasis are included for their historical significance. Important historic ranching operations include the Ryan Mill, Lost Horse Well, Barker Dam, Cow Camp, and Keys Ranch. Wall Street Mill, Lost Horse Mine, and Desert Queen Mine are graphic reminders of past mining activities.

Sites Found Within the Project Area

The route 12 corridor has been surveyed from the west entrance to the Twentynine Palms area (Wallace 1964; USDI 1975; McCarthy 1974, 1976; Jefferson 1973; Simpson 1981; Teague 1983; Ervin 1985; Tagg 1985); route 13 has been surveyed between Cap Rock to Keys View (Jefferson 1973; Simpson 1981). Some of these surveys included adjacent campgrounds, pullouts, and other selected areas. An archeological survey of the unpaved Queen Valley road was completed by the Western Archeological and Conservation Center in April, 1991. A preliminary report has been completed, and a final is under preparation. Portions of the Split Rock road access and the Jumbo Rocks, Sheep Pass, Hidden Valley, and Ryan Campgrounds were surveyed by Erwin (1985). Some sites in these areas had been previously reported by McCarthy (1974, 1976) and Eberhart (1951).

While a total of 30 archeological sites were found within the vicinity of the proposed road, campground and parking lot improvements, only three could be directly affected by the proposals. CA-RIV-1940, on the western segment of route 12, between the West Entrance and Cap Rock, is a light surface scatter of flaked stone artifacts of unknown age or cultural affiliation. It may have been a special-use site where stone materials were procured or worked. In the same vicinity is CA-RIV-1942, a small habitation or camp site where food was prepared or animals processed. This site consists of a concentration of potsherds and burned bone fragments, surrounded by a lighter scatter of sherds and flaked stone, adjacent to a possible midden. This site was probably occupied more than once, for an extended period, by a Patayan group after about AD 750.

In the section between Cap Rock and Keys View, site CA-RIV-1961 consists of ceramic sherds, numerous types of chipped stone, bone, ground stone, a human cremation and a midden area. It was an open habitation or camp site thought to date between AD 1000 and AD 1900. Portions of the site were excavated in 1985."

While these three sites may have the potential to yield scientific information that will elucidate the prehistory of the region, the project can be designed to avoid any adverse impacts. These measures will be discussed in the Environmental Consequences section.

VISITOR EXPERIENCE, PARK MANAGEMENT, AND SAFETY

Annual visitation to the monument passed the one million (1,026,430) visitor mark in 1990. Visitation from January through May, 1991 is up 5.2% over the same period in the previous year. Within a 100-mile radius of the monument there are over 12 million potential visitors. Because of the favorable climate, the monument is open year-round, seven days a week. About half the annual visitation occurs from February through May.

Visitor activities include hiking, backpacking, sightseeing, rock climbing, and camping, all of which depend on the transportation network of the monument. Mountain bike use is also gaining popularity in Joshua Tree National Monument. Current Management policy restricts bicycles to roadways and prohibits trail riding in the monument. A visitor survey was initiated in April 1991 to determine the kinds of visitor activities occurring and the percentage of monument visitors engaging in each type of activity. In 1990 over 230,000 visitors camped in the monument, 60 percent in large RVs. Camping from January through May,1991 has increased 10.8% over the same period in the previous year. Sightseeing by charter bus has become an increasingly popular activity.

As discussed in the Purpose and Need section of this document, visitation type, level, and location has changed dramatically during the past decade due to the increasing population and suburban sprawl of Los Angeles and a substantial increase in the popularity of rock climbing within the monument. Climbers from all over the world converge on the monument particularly during the late winter and spring months. Many climbers feel that this area is among the best areas for rock climbing in the world. One of its attractions is the easy accessibility of the rocks from major metropolitan centers such as Los Angeles, and the easy accessibility of numerous rocks once they arrive in the monument. Such accessibility enables climbers to scale numerous difficult one - pitch climbs within a day. The present layout of monument roads allows climbers to accomplish such feats.

The historical alignment of both routes 12 and 13 allows visitors the opportunity to see the monument as it has been seen in historic time. The narrow roadway winding through huge Joshua trees at the road's edge gives visitors the feeling of driving through a desert forest.

While these roads provide a unique visitor experience reminiscent of a bygone era they also present some problems for present traffic volume. These problems are a result of the existing park roads being deficient in several aspects of modern road design – specifically structure, width, drainage, and alignment. There is little or no structural base material under most of the roads in the park. When the original wagon roads were converted to paved roads desert material was pulled into the road, mixed with oil, bladed smooth and compacted. This is known as desert mix. The roads being reconstructed in the park today have six inches of aggregate base material under two inches of asphalt. These structural inadequacies are compounded by the narrow width of most roads. When large vehicles (RVs, tour buses, park maintenance vehicles, etc.) are forced to drive on the outside edge of the narrow road they break down the pavement edge. This is due to the weight of these vehicles and the lack of lateral support normally provided by base material and/or shoulders. When this occurs the broken edge must be patched or the road continually gets narrower.

Certain sections of both routes 12 and 13 are also deficient in alignment by todays standards. Most roads are posted for 35 or 45 mph which requires certain sight distances. However, the winding and rolling nature of these roads does not provide the adequate sight distances for safely driving these speeds. Narrow roads also tend to cause drivers to crowd the center line. When this occurs in combination with large vehicles and poor sight distances on two way roads, accidents are more likely.

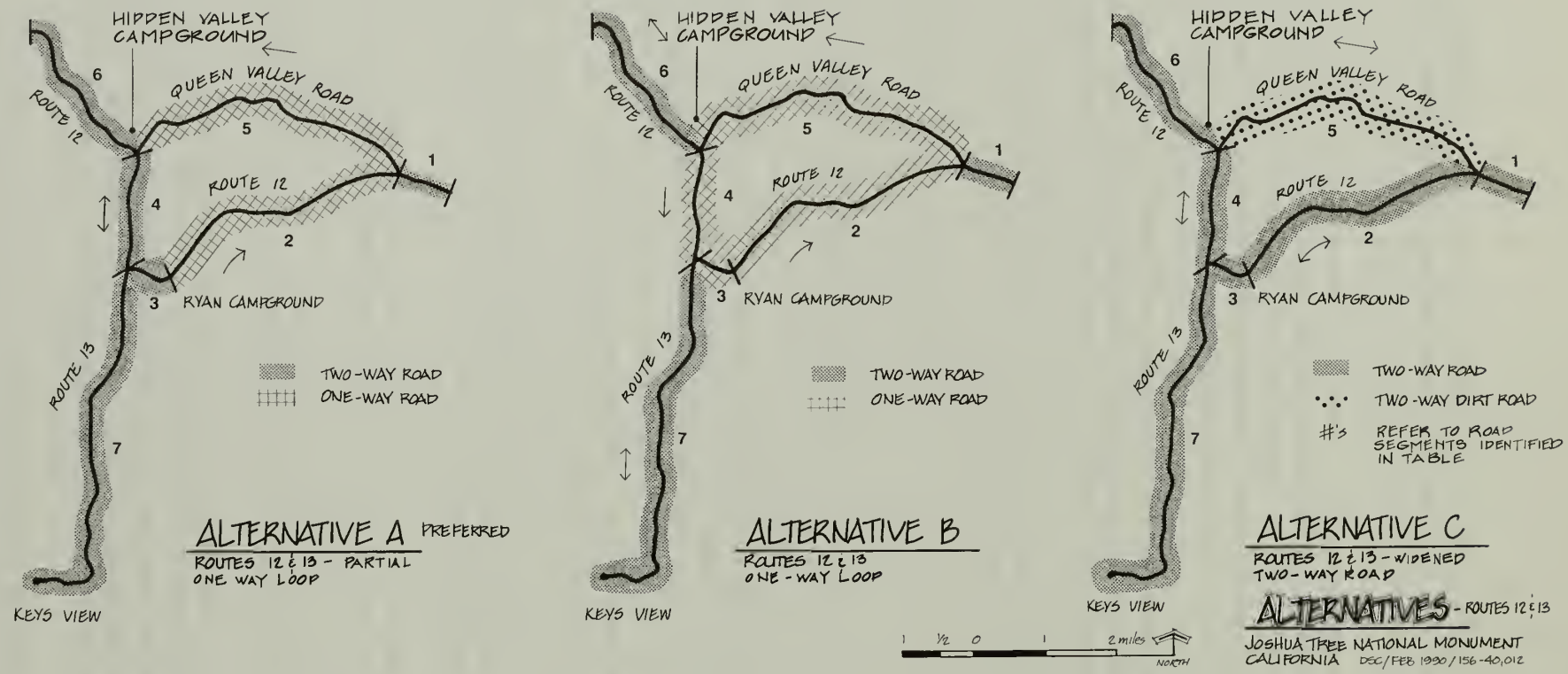
Drainage is more a source of continual maintenance than a major problem on both roads. The use of low water crossings to control flood drainages across roads in the desert is a common practice. On routes 12 and 13 several of the low water crossings are inadequately designed to control flows from heavy flash floods causing water to run down the road edge eroding the shoulder. Several low water crossings are not protected on the leading and trailing edges which, in combination with no base structure, causes the pavement to erode and break off.

Maintenance expenses for the roads have averaged $85,000 per year for labor and materials. Despite this amount of road maintenance funding, the roads continue to deteriorate due to inadequate road structure to accommodate present use.

A parkwide summary of traffic law enforcement and accidents handled by NPS rangers for 1980-1989 shows a yearly average of 34 accidents. Injury accidents occur an average of once each month serious injury accidents occur an average of one every two months and fatal injuries average 1.2 per year. Of the 328 accidents reported during this time period more than half (175) involved significant vehicle damage. There were 54 serious injuries and 12 fatalities involved in the 139 injury accidents.

Rangers report that the majority of accidents result from excessive speed on unexpected sharp curves. The most common type of accident is the single car rollover. Although accidents occur almost anywhere in the monument, the campground and pullout entrances along route 12 and the road from the Twentynine Palms entrance to Pinto Wye seems to be least safe (see Vicinity map). This is due to poor sight distance and vehicle/pedestrian congestion.

Since changes in the road system and associated visitor use areas will affect visitor activities and the visitor experience, this topic will be evaluated in the Environmental Consequences section.



ALTERNATIVES - ROUTES 12 & 13

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA DEC/FEB 1990/156-40,012

ALTERNATIVES

INTRODUCTION

To simplify the alternatives discussion, it is divided into two parts. The first section presents the alternatives developed for the roadway and the second presents the alternatives for the associated visitor use areas.

ROADWAY

Park Routes 12 and 13

Four alternatives were developed to address the problem of the deteriorating road system. In order to better understand the alternatives, the roads have been divided into seven different segments as shown on the following map and described in the following table:

			Alternatives			
Segment	**Length (miles)**	**Width (feet)**	**No Action**	**A**	**B**	**C**
1	0.70	22	2N	2W	2N	2W
2	4.00	22	2N	1N	1N	2W
3	0.50	22	2N	2W	1N	2W
4	1.75	22	2N	2W	1N	2W
5	5.00	12-14	2D	1N	1N	2D
6	2.75	22	2N	2W	2N	2W
7	5.60	20-22	2N	2R	2R	2M
Total	20.30					

2R = Two way, 20 foot top width (10 foot lanes; no shoulders) vehicle restrictions

2M = Two way, 24 foot top width (11 foot lanes; 1 foot shoulders)

2W = Two way, 26 foot top width (11 foot lanes; 2 foot shoulders)

2N = Two way, 22 foot top width (11 foot lanes; no shoulders)

2D = Two way, dirt road, 12-14 foot top width (no shoulders)

1N = One way, 14 foot top width (12 foot lane; 1 foot shoulders)

Although each of these alternatives seeks to fulfill the monument's purpose and management objectives, each has a different emphasis and therefore has slightly different objectives. For example, the primary emphasis of the No Action alternative is to leave park resources and facilities undisturbed and act as a control in order to provide a comparison with the other actions being considered. However, after reviewing the accident statistics and maintenance expenses for the road, it appears that the road has some design flaws that make it unsafe and costly to maintain. As the roads continue to deteriorate, maintenance requirements will continue to increase, though maintenance resources are unlikely to change. The emphasis of the first alternative investigated (C) was to reduce maintenance expenses and accidents. The easiest method of accomplishing this was to bring the road up to modern standards as has been done elsewhere in the park.

This would primarily involve widening and realigning the existing road as well as adding base material to it. However, since this section of roadway traverses some of the finest Joshua tree stands in the park, the extent of required widening would affect a large number of trees (716). Narrowing the road corridor and reducing the design speed (to eliminate some curve realignments) was considered, but, this would result in some of the same maintenance problems experienced on the existing roadway. The current narrow roadway is deteriorating because vehicles travel on the edge of the pavement (where there is no lateral support) causing the edge to break off.

Since narrowing the road was not feasible, other options were considered to reduce the impact of the road on the Joshua trees. The principal method considered was to route westbound traffic over the Queen Valley road so that the existing route 12 corridor (which is already wide enough) could be used to maintain a one-way eastbound route. The current road width could even be narrowed to accommodate the one-way route, substantially reducing impacts on the Joshua trees. This is the approach of alternative B, which has the least impact on the Joshua trees. However, this approach created other problems – visitors traveling from the east would have to travel longer distances to Keys View and visitors at Ryan Campground would have substantially longer travel distances to the west entrance and Keys View. Ranger patrols would also be less efficient. Alternative A was developed to address this problem. Its primary emphasis is to reduce impacts on the Joshua trees and to provide for visitor safety and convenience. A modified one-way loop is considered in this alternative. Alternative A was selected as the Preferred Alternative because it offered the best compromise solution of reducing impacts on Joshua trees and providing for visitor convenience and safety. A description of each alternative follows.

No Action

The objective of this alternative is to act as a control in order to provide a comparison with the other actions being considered.

To achieve this objective, the alternative proposes no modification to the existing roads. The roads would be maintained and repaired on an "as needed" basis, but no substantial improvements would be done.

Alternative A (Preferred) – Partial One-Way Loop

The objectives of this alternative are to:

- Mitigate the effects of the road reconstruction project on the Joshua trees.
- Diversify the visitor experience, increase safety, and provide reasonably convenient access to features of interest.
- Avoid impacts/effects to known cultural resources.
- Ensure the compatibility of this reconstruction effort with past reconstruction efforts on Route 12.

To achieve these objectives, this alternative proposes the following actions:

Route 12 segments 1, 3, and 6 would remain open to two-way traffic. To facilitate convenient access to Keys View from the west end of the park, section 4 of route 12 would remain open to two-way traffic. All of these segments would be reconstructed to the same standard used on previous reconstructions of that road. This action would involve roadway widening from the existing 22-foot top width to a total top width of 26 feet, which includes 11-foot paved lanes and a 2-foot paved shoulder on either side of the two-lane road. Segment 2 of route 12 would be a one-way road going east. The current roadway width of 22 feet would be narrowed to 14 feet and allocated to a 12-foot travel lane with a one-foot shoulder.

Segment 5, the Queen Valley road, would be a one-way paved route going west. This road width, which currently varies between 12 and 14 feet, would be paved to a consistent 14-foot width. Several changes would be made to the road in the Hidden Valley area: 1) The last 0.5 miles of the roadway from just east of Echo "T" to its intersection with Route 12 would be newly constructed and paved to a 14-foot width and a curvilinear alignment (to reduce impact on Joshua trees); 2) the existing roadway would be used to access the Wonderland of Rocks Backcountry Staging Area (site 28, Associated Visitor Use Areas map). This 0.4-mile road segment would be a two-way 22-foot paved route; 3) The remaining 0.25 miles of the road, from the parking area east to the newly constructed road segment, would be obliterated to physically separate it from the rest of the one-way loop.

Route 13 (segment 7), would be reconstructed and remain open to two-way traffic. Since widening of this particular road would have the greatest impact on Joshua trees, it would be reconstructed at its present width of 20 feet (10-foot lanes, no shoulders). Because of the safety concerns of large vehicles (RVs and busses) using a 20-foot wide road, vehicle restrictions would be imposed. No vehicles over 25 feet long and/or 8 feet wide would be allowed. A parking area would be provided at site 13 (Associated Visitor Use Areas map) near Cap Rock to allow large vehicles to park. Interpretation at the parking area would explain the need for the restriction and what is available at the Keys View point.

Route 112 in the Indian Cove area would be realigned and reconstructed to the 24-foot top width (11-foot lanes; 1-foot shoulders) at a 0.1 mile dangerous curve segment.

Alternative B – One-Way Loop

The objectives of this alternative are to:

- Protect the maximum number of Joshua trees along the road reconstruction corridor.
- Maintain the existing visitor experience along these routes by maintaining a narrow road corridor.

Route 12: Road segments 1, 3, 4, and 6 would be modified to achieve these objectives. The remaining road segments would be treated the same as in Alternative A.

Segments 1 and 6 would remain open to two-way traffic and be reconstructed to a narrower top width (22 feet, no paved shoulders) than in alternative A. Segments 4 (1.75 miles) between the Hidden Valley and Keys View intersections and 3 (0.50 miles) between the Keys View and Ryan Campground intersections become part of a one-way loop going east. The current roadway width of 22 feet would be reduced to 14 feet and allocated the same as in segment 2, alternative A.

Route 112 would be treated the same as in alternative A.

Alternative C – Widened Two-Way Roads

The objectives of this alternative are to:

- Provide for visitor safety and convenient access to features of interest.
- Reduce road maintenance expenses.

Route 12: Actions to achieve these objectives include leaving all 9.70 miles of the roadway (segments 1, 2, 3, 4, and 6) open to two-way traffic and widening from the 22-foot paved top width to a total top width of 26 feet. The roadway would include 11-foot paved lanes and a 2-foot paved shoulder on either side of the two-lane road.

Route 13 (segment 7) would remain open to two-way traffic and be widened to a total top width of 24 feet. The roadway would include 11-foot lanes and a 1-foot paved shoulder on either side of the centerline.

The Queen Valley road (segment 5) would remain at its current width and unpaved in this alternative.

Route 112 would be treated the same as in alternative A.

Other Alternatives Considered But Rejected

Additional Road Width Options. Alternatives B and C represent the minimum and maximum numbers of Joshua trees that would be affected by this project. Alternative A represents a compromise between these two alternatives to achieve other objectives of visitor convenience and compatibility with

past road reconstruction efforts. Since the number of Joshua trees affected is dependent on the road width, other alternatives are also possible. For example, in alternative A an additional option of reducing the width of segment 6 was considered. That option would eliminate the paved shoulders leaving a total road width of 22 feet. That action would reduce the number of Joshua trees affected by 25 but was rejected since this width was not compatible with the width of the previously reconstructed road segment immediately east of segment 6. The point where the roadway width changes from 26 feet to 22 feet would be in the middle of a roadway segment rather than at an intersection as proposed in alternative A. A complete discussion of the effects of all alternatives on Joshua trees is given in the section on environmental consequences. Additional information on road width options not included in the alternatives is included in Appendix A. The appendix lists all widths considered for each of the seven sections of road as well as the effect of each width on the Joshua trees.

Ryan Campground Access. Another alternative considered modifying the one-way road system proposed in alternative B in order to provide more convenient access to Ryan Campground. In this alternative, the campground access road would be relocated to intersect with the Keys View road (Route 13). The new access road would be about 0.5 miles of 22-foot wide paved curvilinear route winding through sparse Joshua trees to the campground. It was rejected for two reasons: unacceptable impacts on the Joshua trees; more convenient access was available by maintaining the 0.5 miles of segment 3, Route 12, as a two-way route.

ASSOCIATED VISITOR USE AREAS

Three alternatives were developed for the associated visitor use areas. As with the alternatives for the roadway, each of these alternatives seeks to fulfill the monument's purpose and management objectives, but, since each has a different emphasis, each has different objectives. A description of the alternatives follows. A table on the following page compares actions proposed for all associated visitor use areas in all three alternatives.

No Action

The objective of this alternative is to act as a control in order to provide a comparison with the other actions being considered.

To achieve this objective, the alternative proposes no modification to the areas. The associated visitor use areas would continue to be maintained and repaired on an "as needed" basis, but no substantial improvements would take place and no new areas would be added.

Alternative A (Preferred)

The following objectives were developed for the roadway corridor and **all** associated visitor use areas:

- To provide adequate parking (based on existing use) properly located to serve the needs of all appropriate visitor activities.

ASSOCIATED VISITOR USE AREAS – DESIGNATED PARKING COMPARISON							
Parking Areas	Alternative						Preferred Alternative Function
	No Action		A (Preferred)		B		
	Cars	RV'S	Cars	RV'S	Cars	RV'S	
*1. Desert Environments	5	1	15	3	15	3	Interpretation/Orientation
2. Rock Climbing Exhibit	6	0	30	4	12	2	Interpretation/Climbing
*3A. Wait Lot/Keys Ranch	6	0	0	0	8	2	Trailhead
3B. Boy Scout Hiking Trailhead	8	0	30	6	0	0	Trailhead
3C. Wonderland of Rocks Orientation-West	0	0	15	3	5	0	Interpretation/Orientation
4A. Lost Horse Ranger Station Access Road	10	0	20	0	0	0	Trailhead/Rockclimbing
4B. Cyclops Formation	0	0	5	2	0	0	Rockclimbing
5. Hidden Valley – North Lot	5	0	15	3	15	3	Trailhead
6. Hidden Valley Trailhead	17	2	40	6	22	3	Trailhead/Orientation
7. Turtle Rock Picnic Area	20	2	40	6	20	0	Picnicking/Rockclimbing
*8. Hidden Valley Day Use Lot	25	0	0	0	0	0	Camping/Picnicking
9A. Intersection Rock	40	4	50	6	35	3	Rockclimbing
9B. Echo "Y"	0	0	25	0	0	0	Trailhead/Rockclimbing
*10. Rock Pile Exhibit	0	0	0	0	0	0	Eliminate
11. Mojave Plants Exhibit	0	0	5	2	5	0	Interpretation
12. Cap Rock	15	2	14	6	14	2	Picnicking/Interpretation/Rockclimbing
13. Gauging Station/RV Drop	0	0	26	17	0	17	RV trailer drop lot/Cap Rock overflow
14. Juniper Flats Backcountry Trailhead	10	0	20	5	0	5	Trailhead/Interpretation/Orientation
15. Lost Horse Mine	8	0	25	5	0	5	Trailhead

ASSOCIATED VISITOR USE AREAS – DESIGNATED PARKING COMPARISON							
Parking Areas	Alternative						Preferred Alternative Function
	No Action		A (Preferred)		B		
	Cars	RV'S	Cars	RV'S	Cars	RV'S	
16. Black Brush Hillsides	0	0	5	0	5	0	Interpretation
17. Wonderland of Rocks Overlook	1	0	5	0	5	0	Interpretation
18. Keys View	45	2	45	0	45	0	Interpretation/Trailhead
19. Ryan Ranch	1	0	5	2	5	0	Trailhead/Interpretation
*20. Ryan Turnout	16	3	0	0	0	0	Eliminate
21. Hall of Horrors	10	0	44	5	44	5	Rockclimbing/Trailhead
22. Ryan Mountain Trailhead/Indian Cave Exhibit	11	3	40	6	8	2	Trailhead/Interpretation/Rockclimbing
23. Geology Tour Road/Desert Queen Backcountry Trailhead	5	2	20	6	13	0	Trailhead/Interpretation/Rockclimbing
24. Wonderland of Rocks Orientation – East	0	0	15	3	15	3	Interpretation/Orientation
25. Wall Street Mill – Barker Dam	25	0	75	5	20	3	Rockclimbing/Trailhead
26. Wonderland of Rocks Interpretive Exhibit	0	0	5	2	5	0	Interpretation
*27. Traffic Control Pullouts	0	0	100	50	100	50	2 car pullouts for traffic control
28. Wonderland of Rocks Backcountry Staging Area	15	0	75	5	75	5	Trailhead/Rockclimbing
29. Split Rock	6	0	16	4	6	2	Picnicking/Rockclimbing/Trailhead
*30. Live Oak	15	0	0	0	0	0	Picnicking/Rockclimbing
*31. Desert Nomads Exhibit	2	0	0	0	0	0	Eliminate interpretive exhibit; maintain parking for traffic control
TOTALS	219	21	825	162	497	115	

**Numbers correspond to the maps, pages 38-72.

*No maps included for these sites which are not included in the preferred alternative.

- To control damage to resources from driving and parking in undesignated areas and "trailing" to popular sites.

- To minimize disturbance to resources (specifically Joshua trees, rock outcrops, drainages, cultural resources) from public use patterns and new construction.

- To maximize use of existing disturbed areas, where feasible.

- To restore previously impacted sites, where possible.

- To provide site design guidelines – rock barriers, curbing, comfort stations, fencing, etc.

- To provide a coordinated interpretive plan which will help accomplish the monuments purpose of providing visitors the opportunity to experience and understand monument resources.

- To simplify parking and roadway turning movements.

To achieve these objectives, this alternative proposes a combination of related projects to: improve visitor safety and reduce maintenance costs; provide orientation for visitors as well as rock climber viewpoints; provide adequate parking for cars, RV's, and buses in designated areas; and improve the visitor experience and visual quality of the area relating to site furniture (comfort stations, trash receptacles, barriers, etc.). All motor vehicle travel and parking spaces will be paved to: define the spaces: reduce maintenance; add continuity. Visual impacts from the paved parking areas will be reduced by using colored concrete curbing and chip seal to match the natural terrain.

Specific objectives for each visitor use area and the actions proposed to achieve these objectives are listed below by area. Numbered sites within each area are in parentheses following the area name. Following the discussion of all areas, maps are included which locate the numbered sies and illustrate the actions proposed for each area.

In the West Entrance area (site 1), objectives are:

- To welcome visitors to Joshua Tree National Monument and orient them to parkwide opportunities.

To achieve this objective, a 15-car/3-RV parking area with interpretive kiosk would be constructed in an existing disturbed area near the west entrance.

In the Wonderland of Rocks area (sites 2-10, 25, 26, 28), objectives are:

- To look at parking from a "regional" perspective so that the needs of all visitors to this very popular area can be provided for.

- To minimize visual impact of parking lots.

- To control resource damage in the campground areas.

- To separate day use and camping uses.

- To provide visitor information/orientation prior to entry to the Hidden Valley developed area.

To achieve these objectives, the main intersection would be relocated to the west side of Intersection Rock and designed to include left turn lanes on north and south approaches. A 25 mph speed could be posted for this intersection and for spur roads to the day use areas and campground access. Day use parking would accommodate 420 cars and 47 RVs in 13 distinct areas. Parking for campground information parking and return loop to the spur road would be provided prior to the Hidden Valley Campground entry. The existing day use parking area in Hidden Valley campground would be converted to a campground loop; to control resource damage, the campground would be rehabilitated (e.g. providing tables, toilets, defining tent pads, and paving all campground roads and parking spaces so that visitor use could be confined to designated areas.) The spur road would be reconstructed/paved to the Barker Dam/Keys Ranch entry road.

At Cap Rock (sites 11-13), the objectives are:

- To improve circulation and provide for picnicking and rock climbing.

- To provide a drop lot for RVs too large to travel on Route 13.

- To maintain the natural environment and visual integrity of the interpretive trail at Cap Rock.

To achieve these objectives, a 14-car/6-RV paved parking area would be constructed at Cap Rock. Additional parking for cars and RVs would be provided in the RV drop lot 0.25 miles south. This would define circulation and parking as well as discourage visitors from parking their vehicles next to Joshua trees.

At Keys View (sites 14-18) objectives are:

- To improve circulation and parking at the comfort station.

- To provide a barrier-free accessible viewing area.

- To provide visitors access to the backcountry and Lost Horse mine.

- To provide visitors the opportunity to enjoy several prime views of the Wonderland.

To achieve these objectives, a barrier-free accessible vault toilet would be installed and parking improved at the comfort station location. The port-a-potties would be removed. A barrier-free viewing platform and associated retaining wall would replace the sidewalk and wall. Curbcuts would be recessed in the sidewalk rather than extended into the parking area. New parking areas would be added at sites 16 and 17 and areas improved at sites 14 and 15.

At Ryan Mountain (sites 19-22) objectives are:

- To cleanup and define roadside parking areas.

- To provide a new parking area for the Hall of Horrors rock climbing area on the north side of Route 12.

- To control resource damage in the campground area.

To achieve these objectives, the parking area at Ryan Tank would be obliterated. Parking would be provided for 40 cars and 6 RVs at site 22. A new parking area for 44 cars and 5 RVs would be provided for the popular Hall of Horrors rock climbing area on the north side of Route 12. Finally, parking for 5 cars and 2 RVs would be provided at Ryan Ranch. All campground roads and parking spaces would be paved and vehicles confined to the pavement in both Sheep Pass and Ryan campgrounds. Both areas would be rehabilitated in the same manner as Hidden Valley Campground.

At Geology Tour Road (sites 23, 24), the objective is:

- To provide visitor parking for orientation, interpretation, and backcountry access.

To achieve this objective, two parking areas with a total of 35 spaces for cars and 9 RVs and a restroom will be provided.

At Split Rock/Live Oak (sites 29-31) the objectives are:

- To improve circulation and provide for parking.

- To maintain the visitor experience at Live Oak.

To achieve these objectives, the existing turnaround parking area at Split Rock would be redesigned to provide parking spaces for 16 cars and 4 RVs. Live Oak would remain as is. The Desert Nomads exhibit would be eliminated and the pullout retained.

Alternative B

This alternative is similar to alternative A in that it seeks to control resource damage through proper planning and location of parking facilities. However, the approach to resource protection is much more conservative. This alternative seeks to control resource damage to the area by limiting visitation to the levels that could be accommodated **primarily** by paving over existing designated parking areas. The following objectives were developed for the associated visitor use areas in this alternative. All objectives are the same as in alternative A, except for the first.

- To provide for parking **primarily** in existing designated areas by paving and striping those areas.

- To control damage to resources from driving and parking in undesignated areas and "trailing" to popular sites.

- To minimize disturbance to resources (specifically Joshua trees, rock outcrops, existing drainages, cultural resources) from public use patterns and new construction.

- To maximize use of existing disturbed areas, where feasible.

- To restore previously impacted sites, where possible.

- To provide site design guidelines – rock barriers, curbing, comfort stations, fencing, etc.

- To provide a coordinated interpretive plan which will help accomplish the monuments purpose of providing visitors the opportunity to experience and understand monument resources.

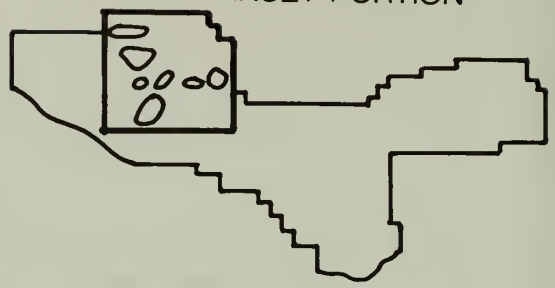
- To simplify parking and roadway turning movements.

To achieve these objectives, the same actions proposed in alternative A would be pursued but in fewer areas and to accommodate lower levels of visitation. Differences in the two alternatives are shown in the parking area comparison chart in the first part of this section. There are several reasons for the large difference between the numbers of designated parking spaces in this alternative and the no action alternative. There are presently no designated traffic control pullouts (area 27 in the Designated Parking Comparison table) in the project area. In both alternatives A and B, parking spaces for 100 cars and 50 RVs' are added. Parking spaces in areas 21 and 28 are substantially increased in alternative B. The remainder of the differences in parking spaces is attributed to design changes allowing more efficient use of space.

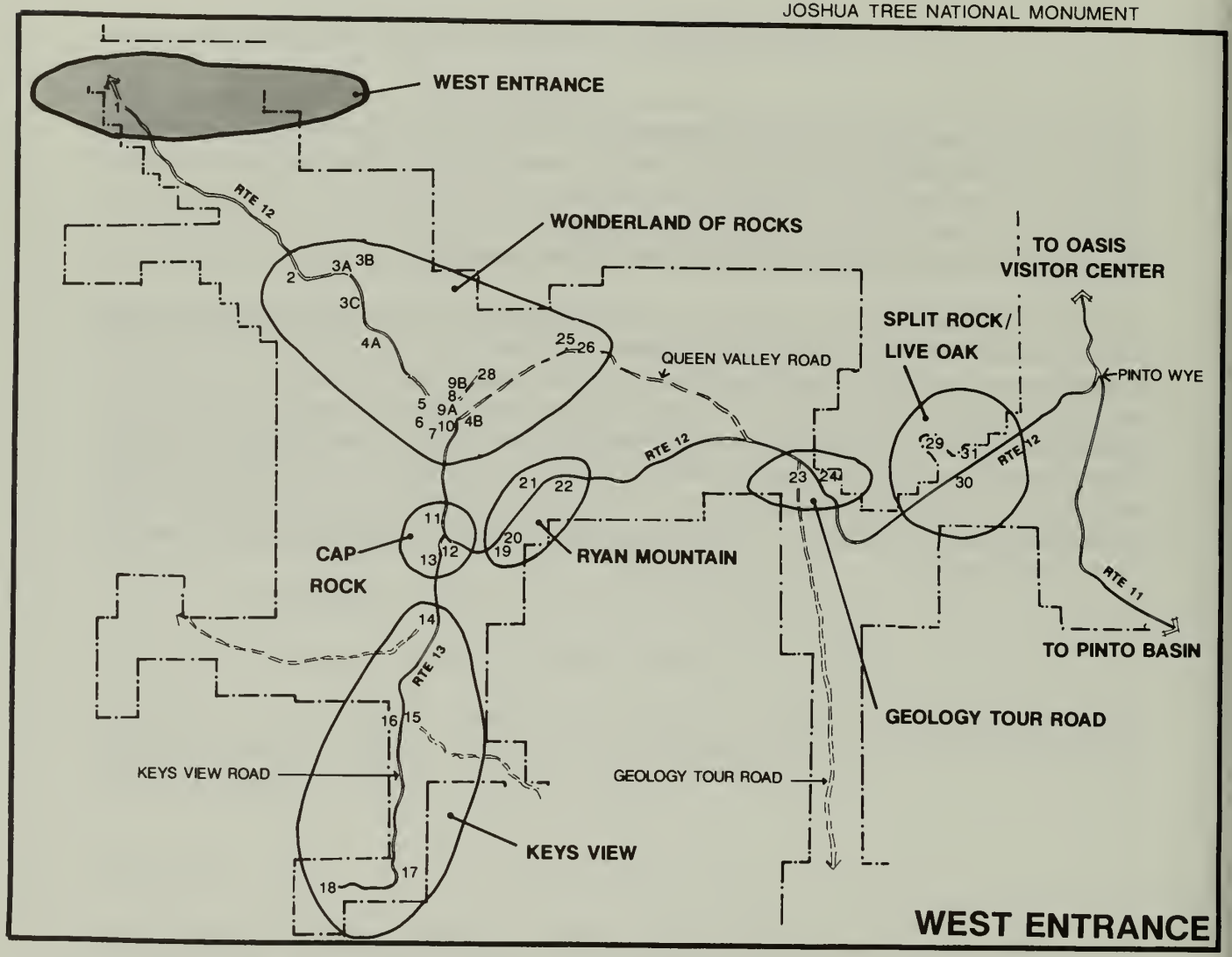
NO SCALE

NORTH

INSET PORTION



JOSHUA TREE NATIONAL MONUMENT



LEGEND

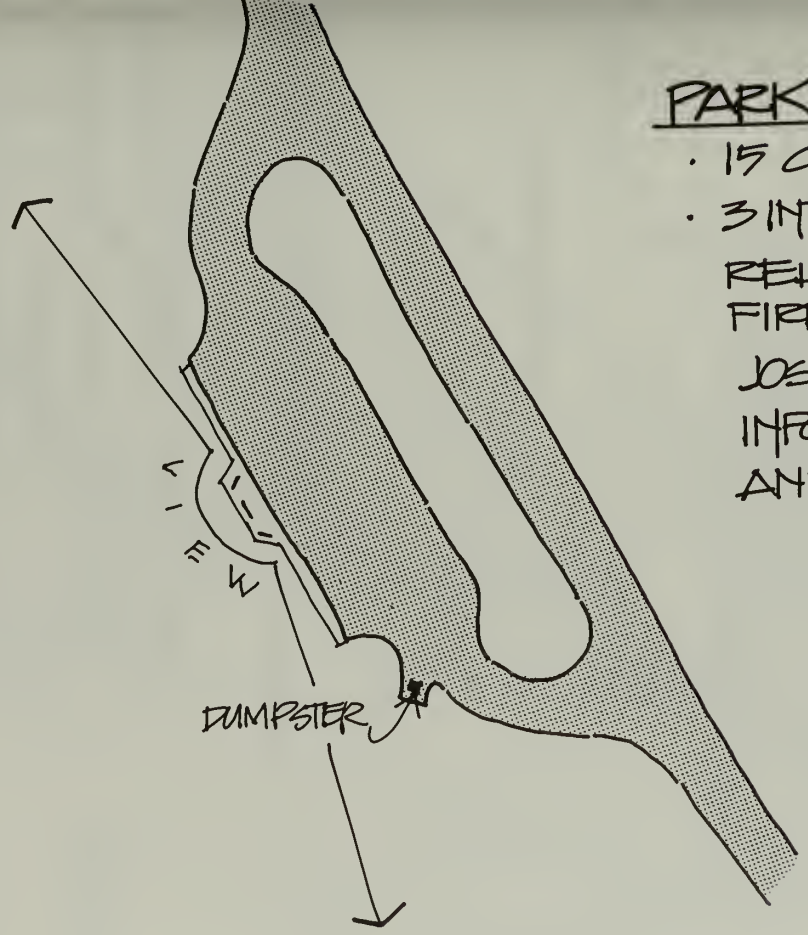
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAP PAGE 39

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,049



PARKING

- 15 CARS / 3 RV'S
- 3 INTERPRETIVE EXHIBITS RELATING TO THE ROLE OF FIRE IN DESERT ECOSYSTEMS, JOSHUA TREES, AND GENERAL INFORMATION ON DESERT LANDSCAPE AND PURPOSE OF THE PARK.

PROPOSED PAVEMENT

100 0 100 FEET NORTH

1. DESERT ENVIRONMENTS

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

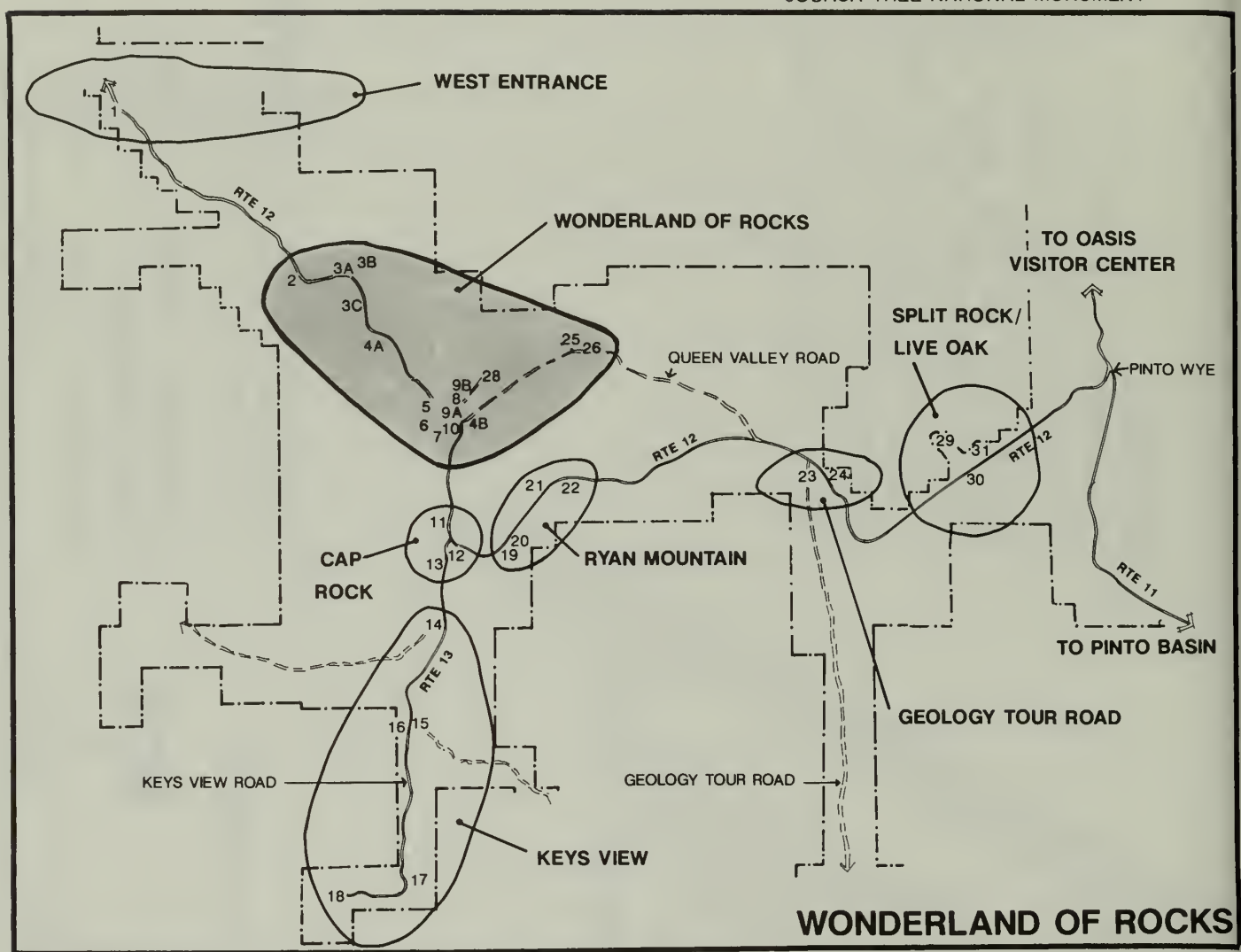
DSC/JUNE 1991/156/40,027

NO SCALE

NORTH

INSET PORTION

JOSHUA TREE NATIONAL MONUMENT



LEGEND

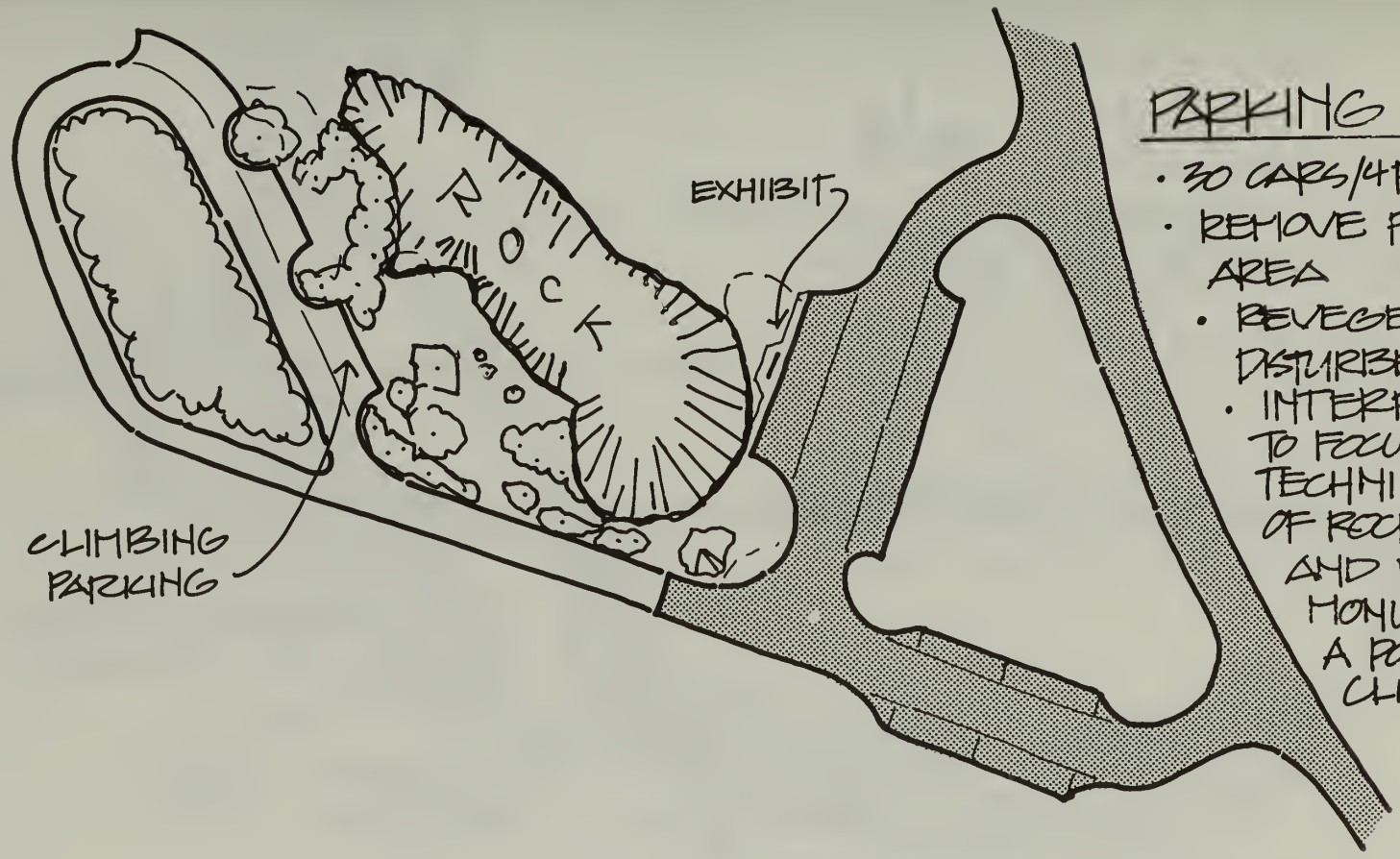
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAPS PAGES 41 TO 53

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,049



PARKING

- 30 CARS/4 RV
- REMOVE PICNIC AREA
- REVEGETATE DISTURBED AREAS
- INTERPRETATION TO FOCUS ON TECHNICAL ASPECTS OF ROCK CLIMBING AND WHY THE MONUMENT IS SUCH A POPULAR ROCK CLIMBING AREA.

DISTURBED AREA

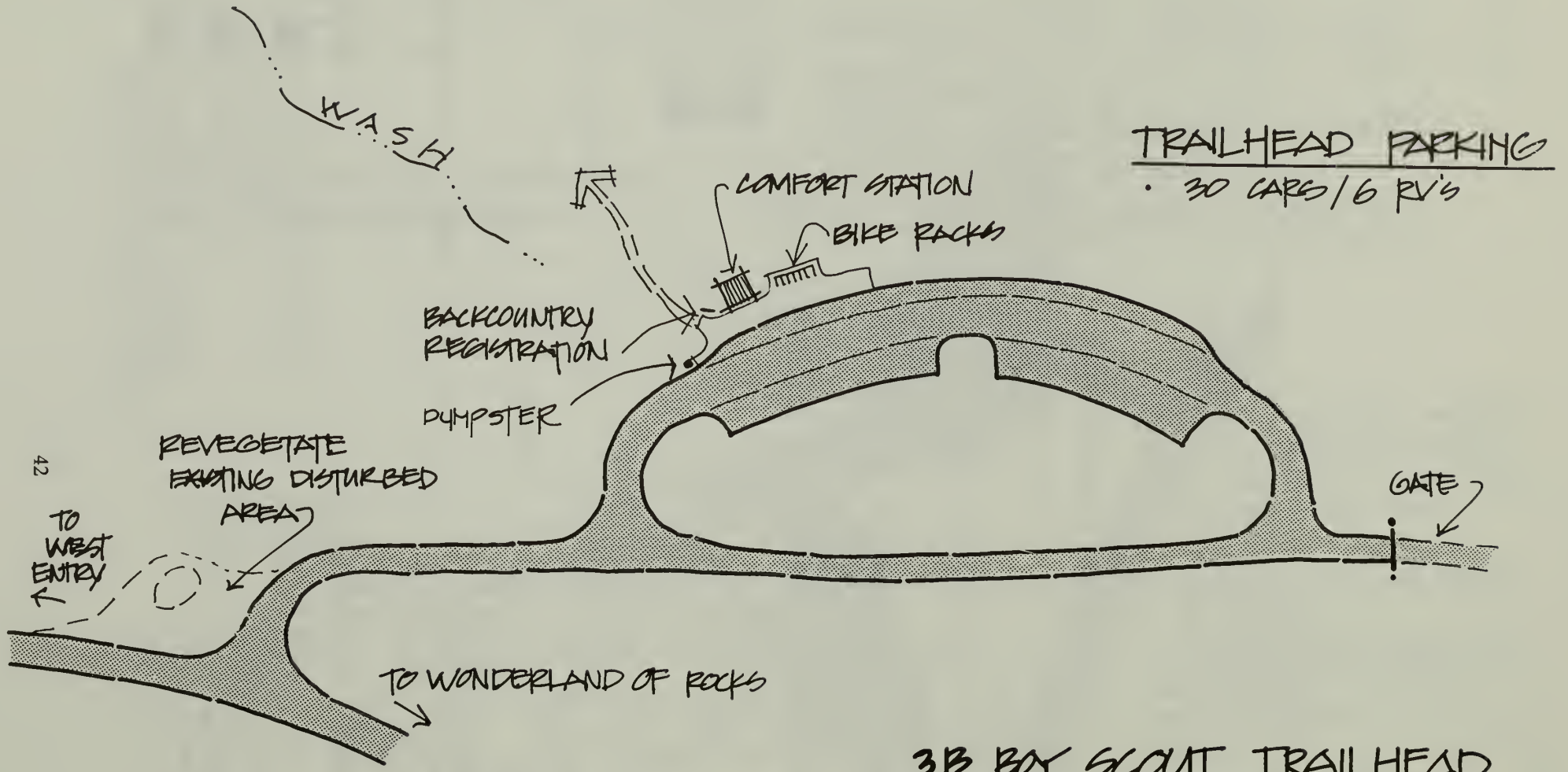
PROPOSED PAVEMENT

100 0 100 FEET NORTH

2. ROCK CLIMBING EXHIBIT
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,026

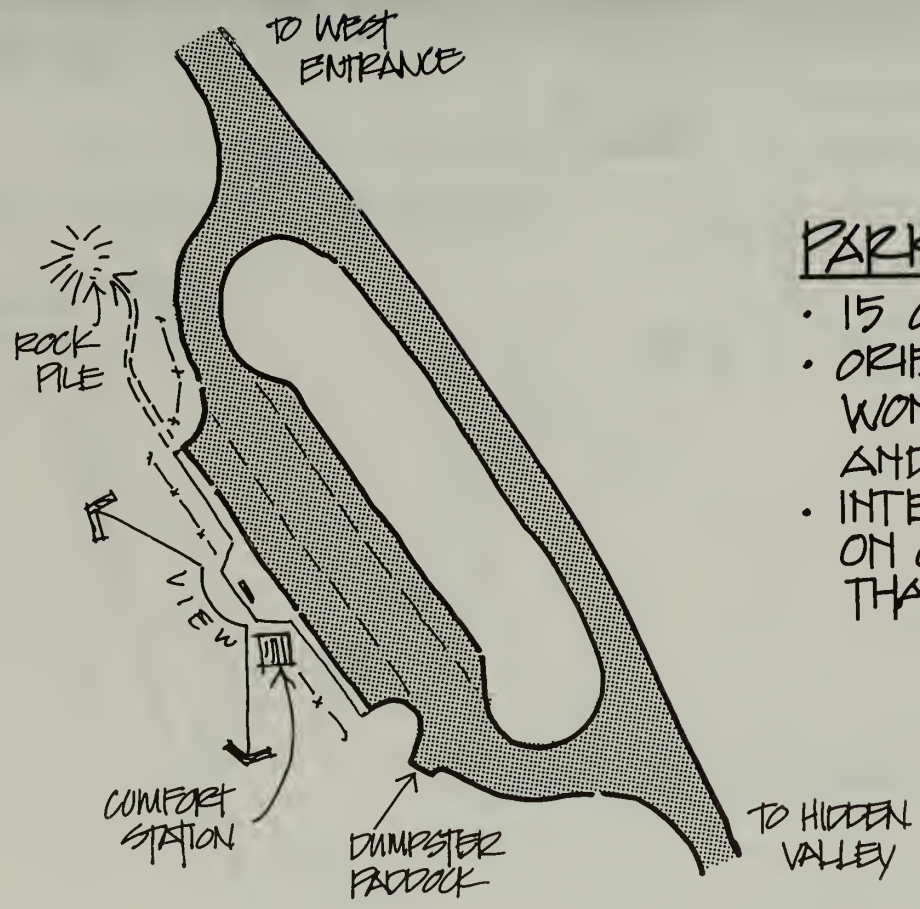


3B. BOY SCOUT TRAILHEAD

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,050



PARKING AREA

- 15 CARS / 3 RV'S
- ORIENTATION RELATING TO WONDERLAND OF ROCKS AREA AND PARK ROADS IN GENERAL.
- INTERPRETIVE EXHIBIT TO FOCUS ON GEOLOGY OF ROCK PILES THAT ARE PROMINENT IN THIS AREA.

—x—x— FENCE

PROPOSED PAVEMENT

100 0 100 FEET NORTH

3C. WONDERLAND OF ROCKS ORIENTATION - WEST

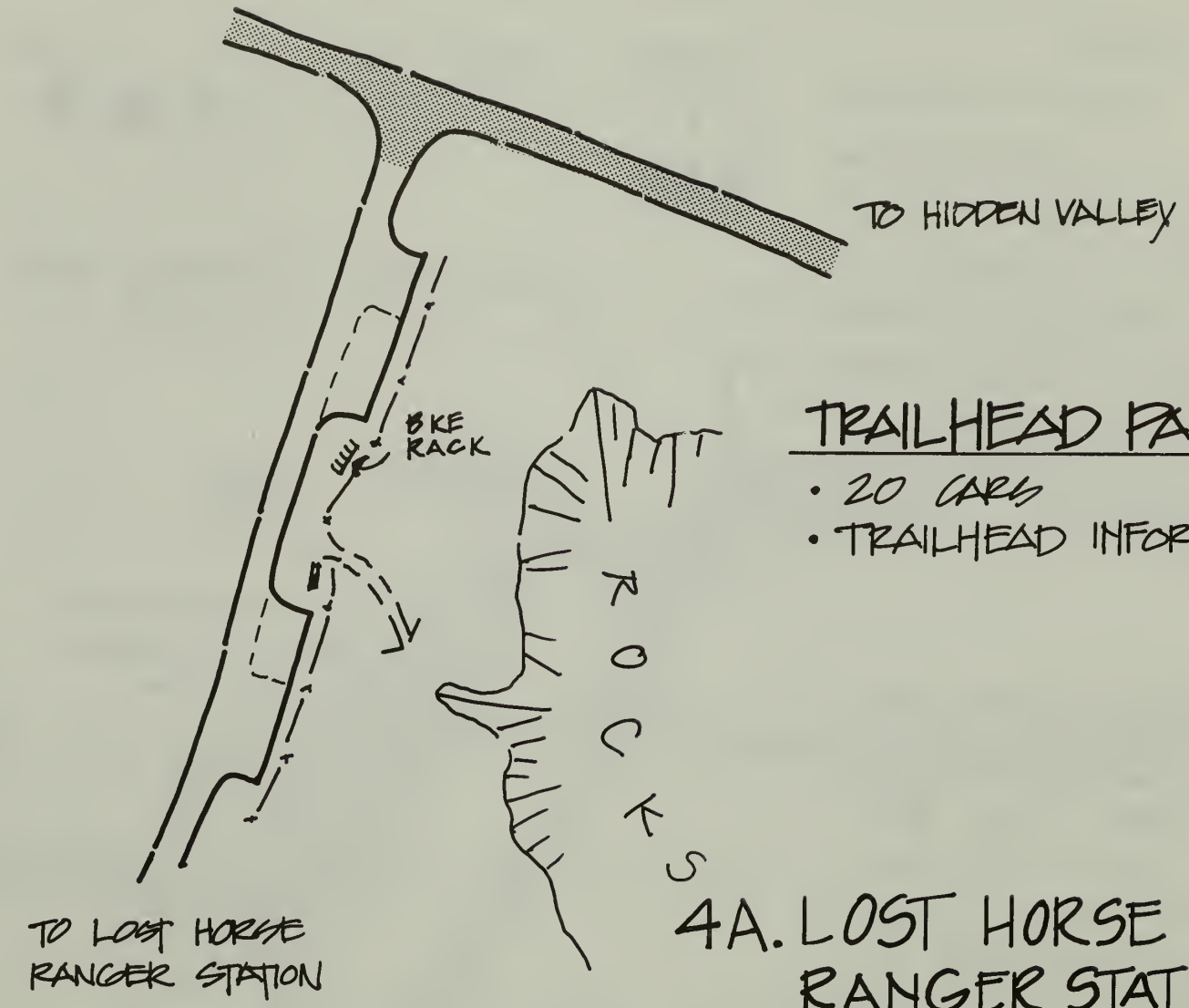
CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,031



TRAILHEAD PARKING

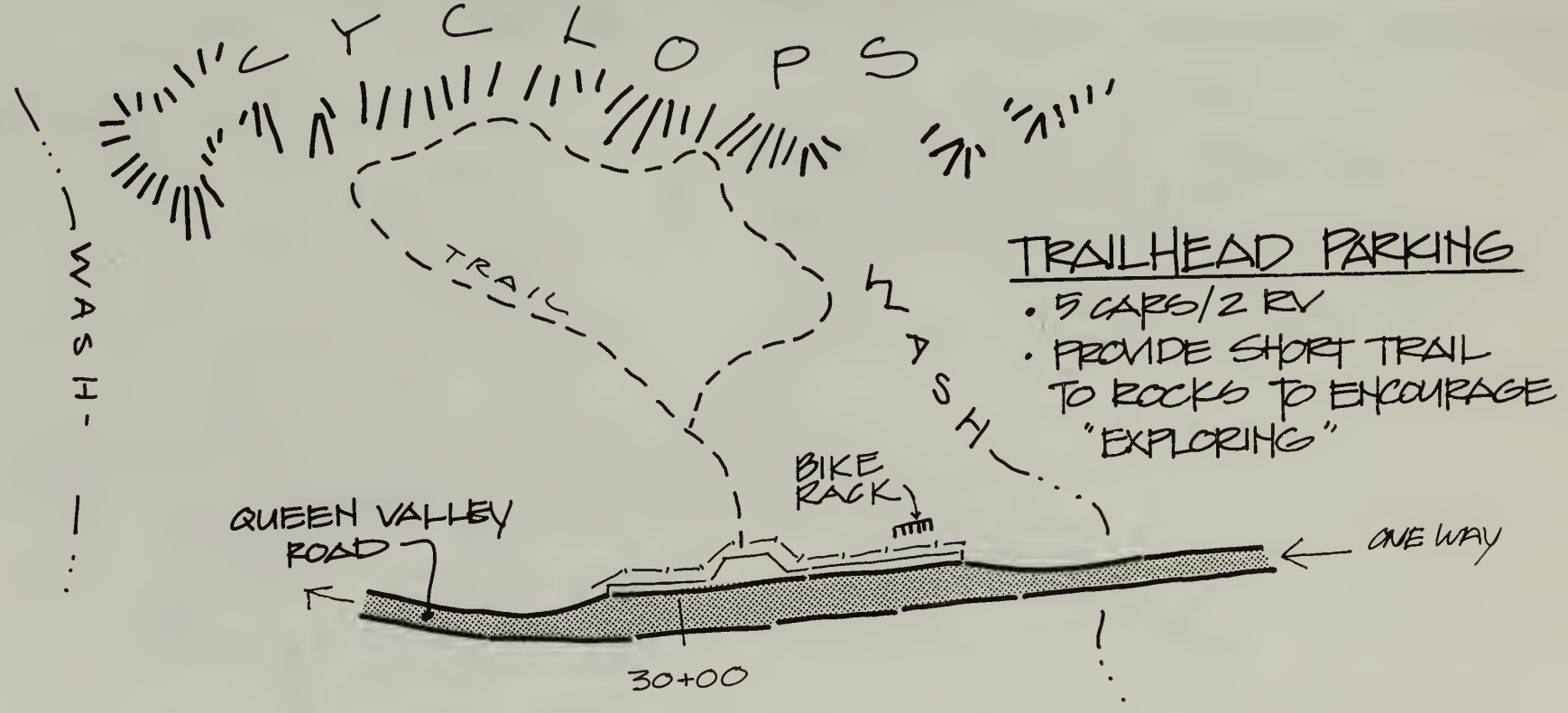
- 20 CARS
- TRAILHEAD INFORMATION

4A. LOST HORSE RANGER STATION ACCESS ROAD

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,051



4B. CYCLOPS FORMATION

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

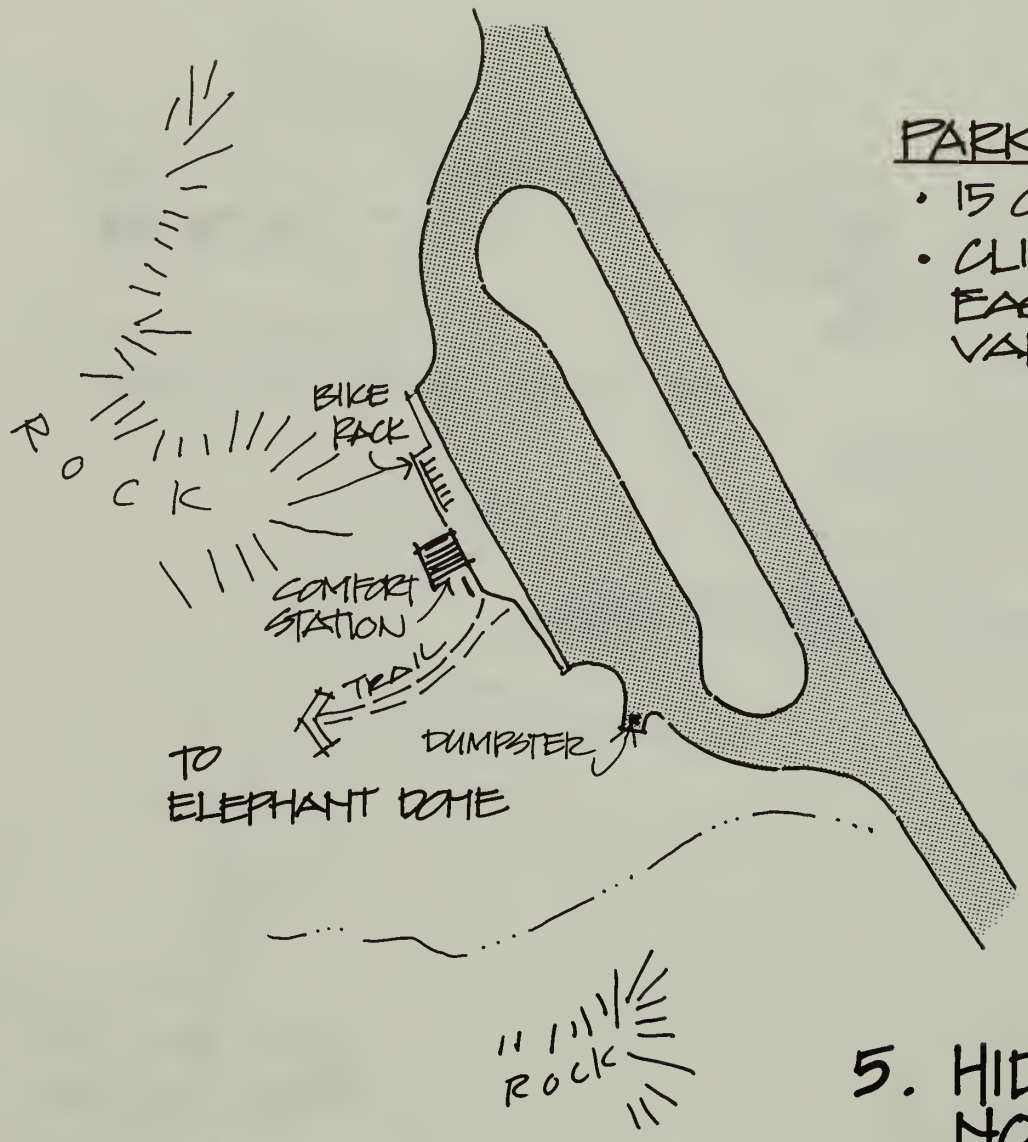
PROPOSED PAVEMENT

FENCE

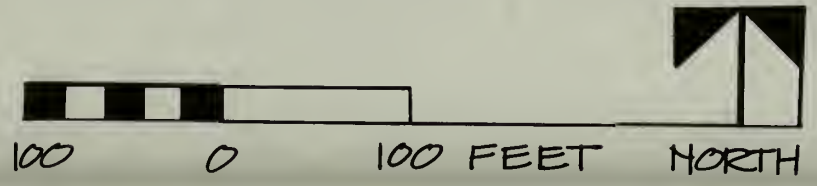
100 0 100 FEET NORTH

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,052



PROPOSED PAVEMENT



PARKING

- 15 CARS / 3 RV'S
- CLIMBING TRAILHEAD TO EAST SIDE OF REAL HIDDEN VALLEY.

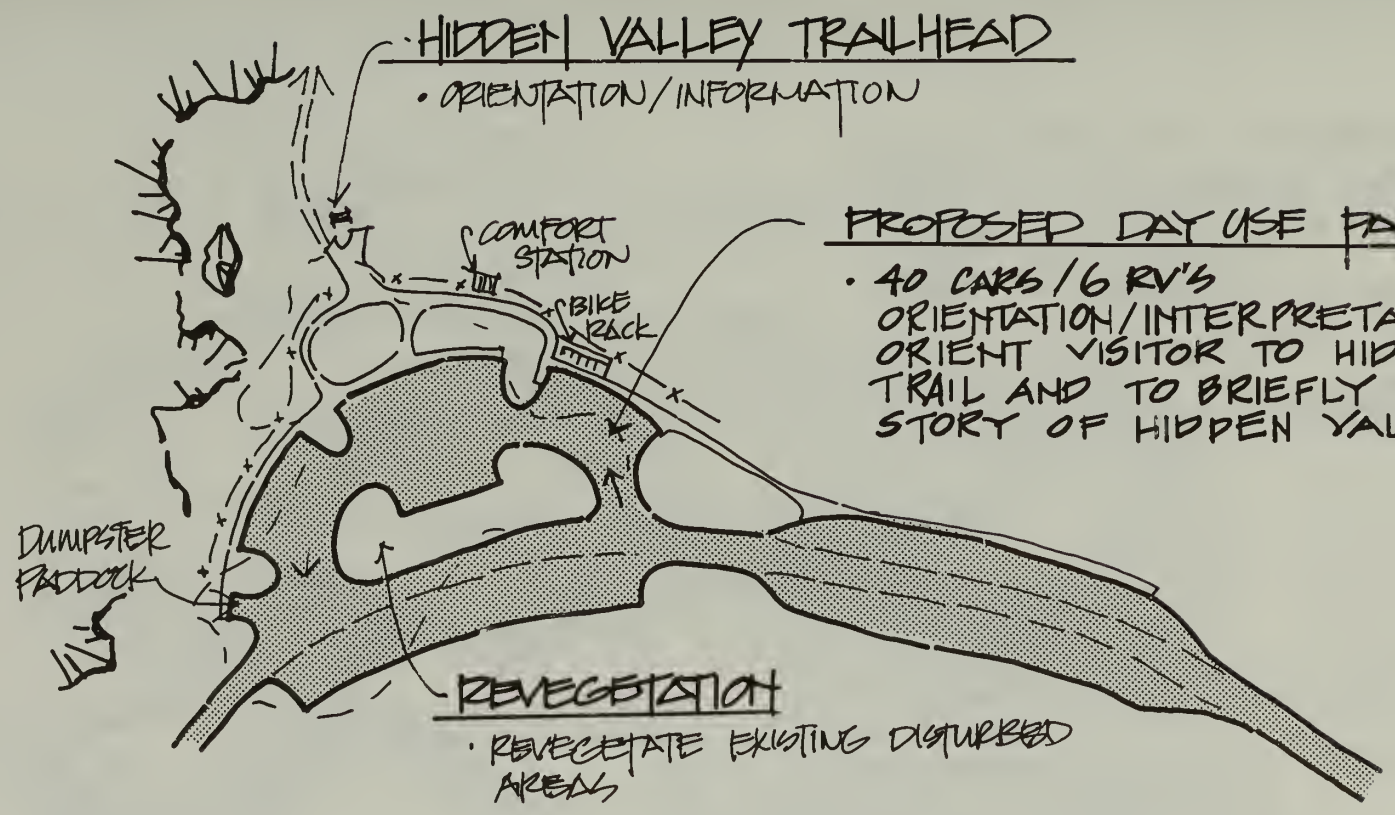
5. HIDDEN VALLEY — NORTH LOT

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,053



DISTURBED AREAS

PROPOSED PAVEMENT

FENCE

0 50 100 FEET

NORTH

6. HIDDEN VALLEY TRAILHEAD

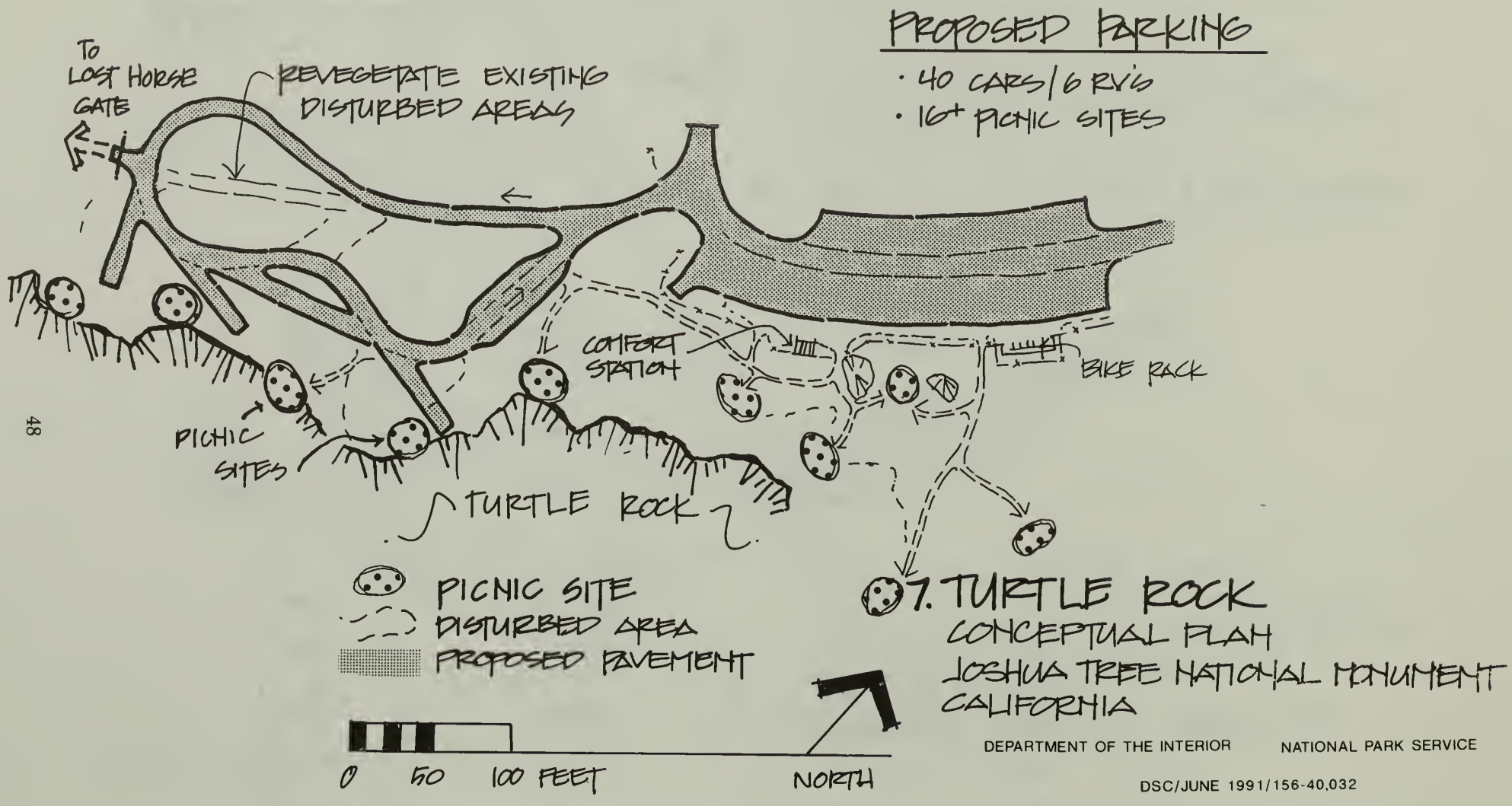
CONCEPTUAL PLAN

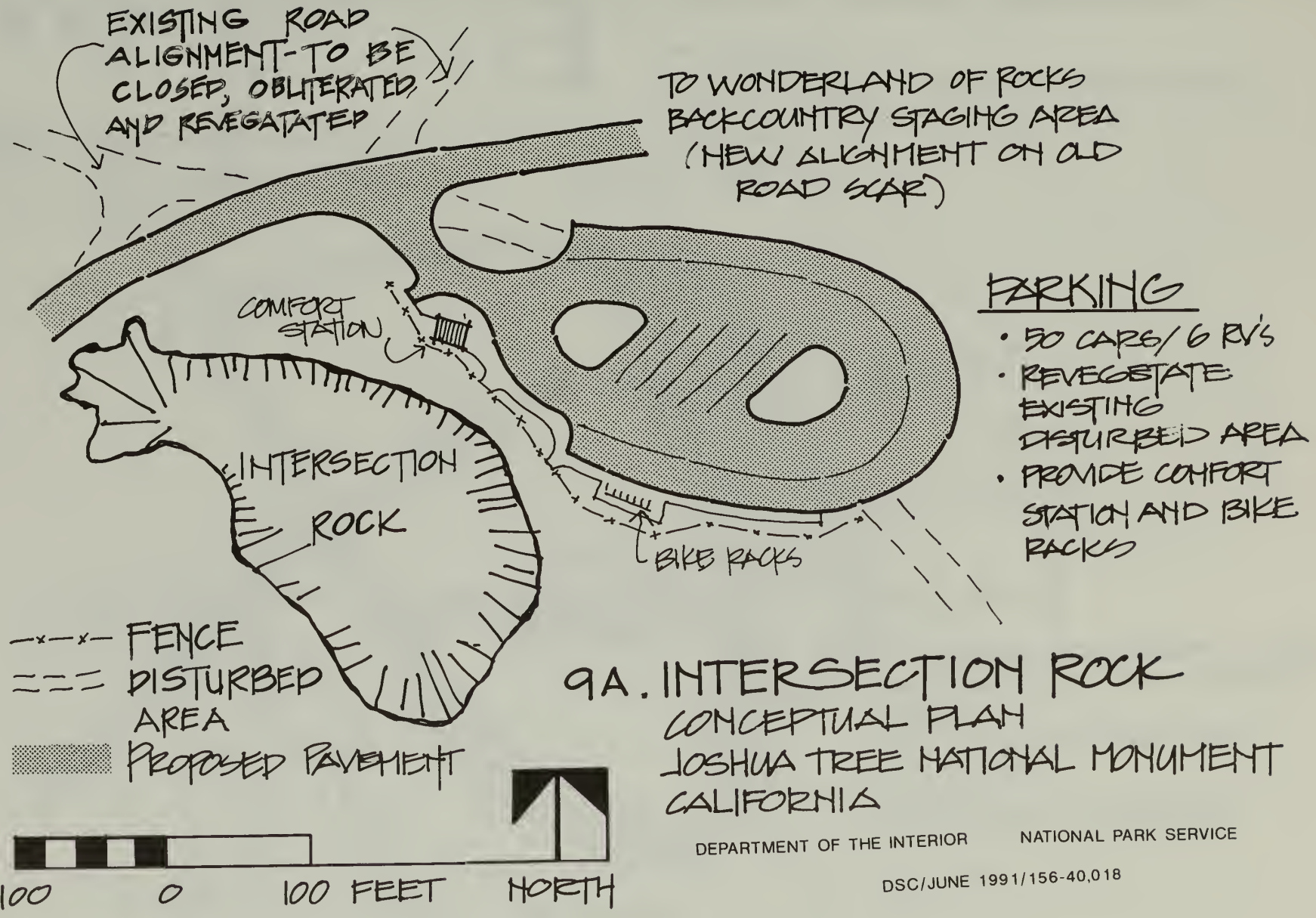
JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,015

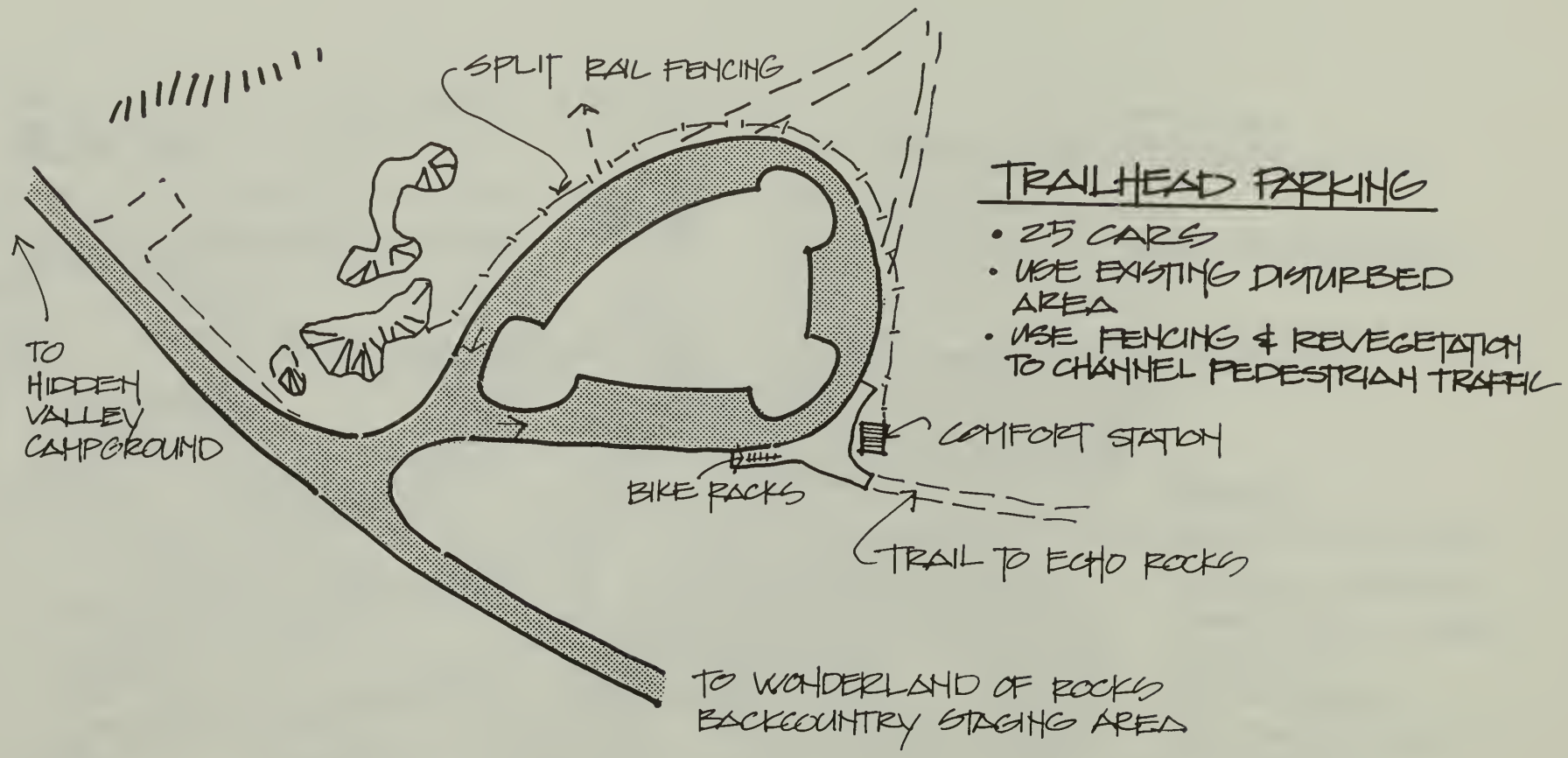

PROPOSED PARKING
· 40 CARS/6 RV's
· 16+ PICNIC SITES
TO LOST HORSE GATE
REVEGETATE EXISTING DISTURBED AREAS
COMFORT STATION
BIKE RACK
PICHIC SITES
TURTLE ROCK
PICNIC SITE
DISTURBED AREA
PROPOSED PAVEMENT
0 50 100 FEET
NORTH
7. TURTLE ROCK
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA
DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE
DSC/JUNE 1991/156-40,032



9A. INTERSECTION ROCK
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,018


SPLIT RAIL FENCING
TRAILHEAD PARKING
• 25 CARS
• USE EXISTING DISTURBED AREA
• USE FENCING & REVEGETATION TO CHANNEL PEDESTRIAN TRAFFIC
TO HIDDEN VALLEY CAMPGROUND
COMFORT STATION
BIKE RACKS
TRAIL TO ECHO ROCKS
TO WONDERLAND OF ROCKS BACKCOUNTRY STAGING AREA

—v—x— FENCE
DISTURBED AREA
PROPOSED PAVEMENT

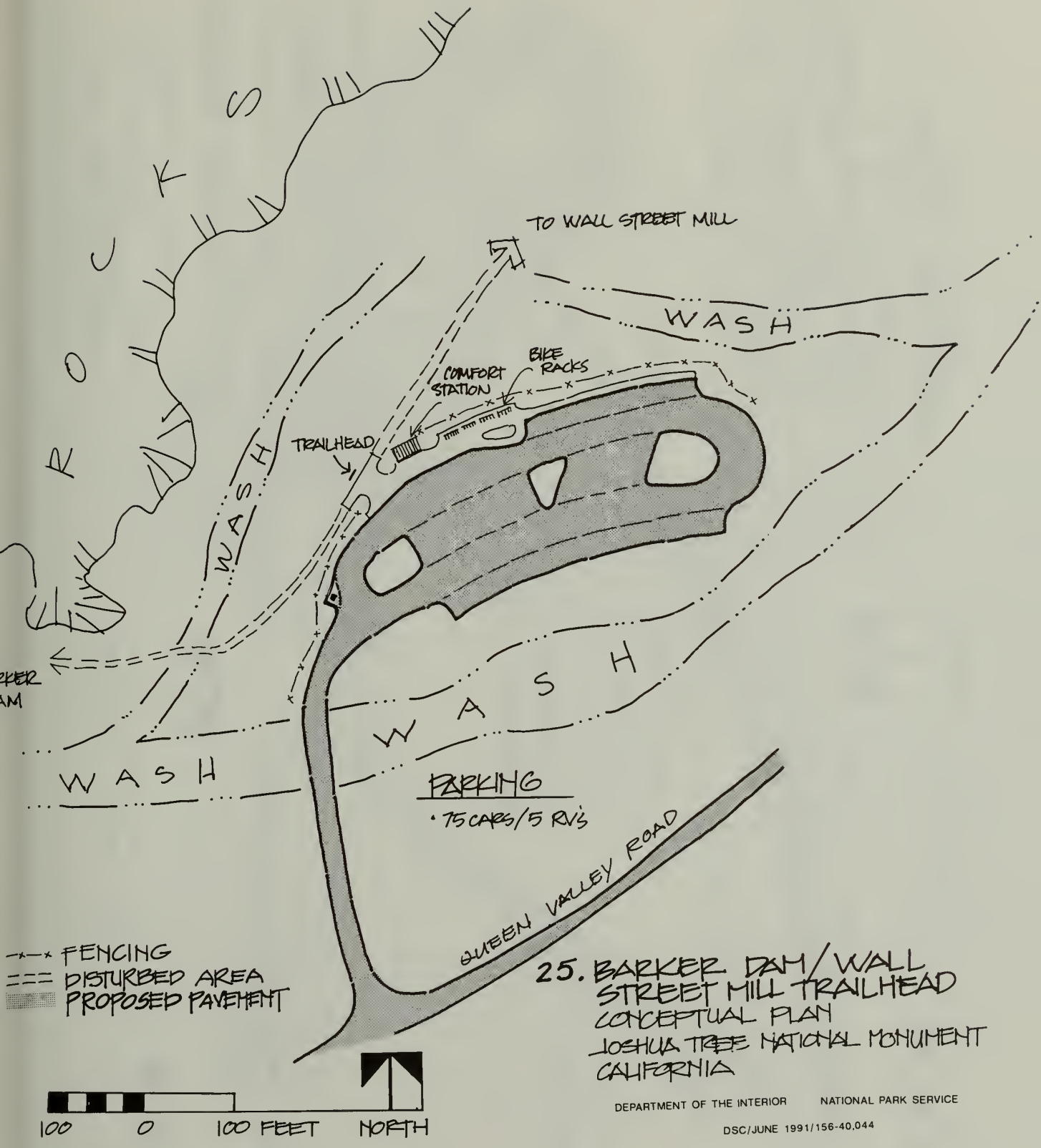
100 0 100 FEET NORTH

9B. ECHO "Y"

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

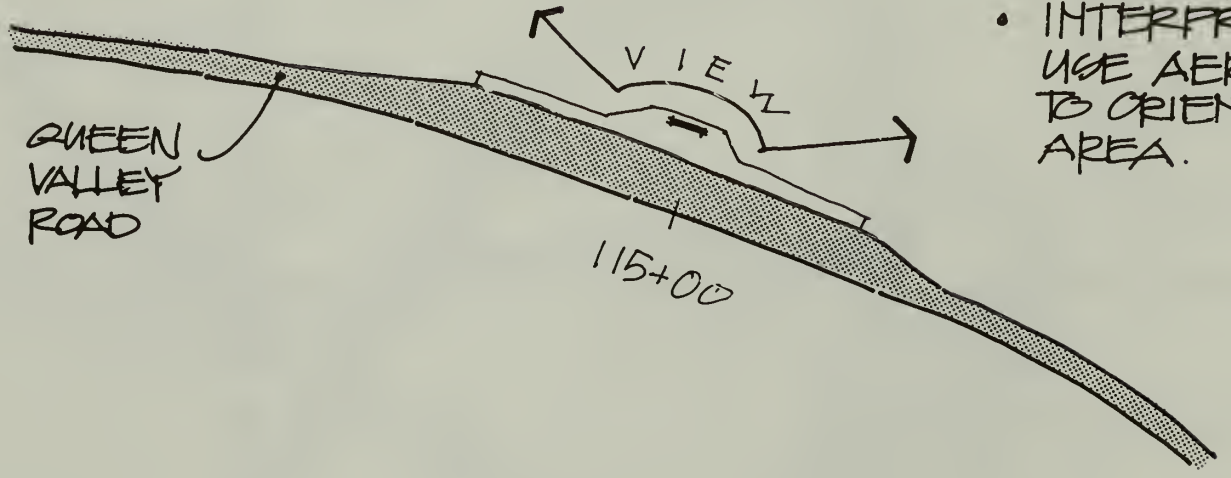
DSC/JUNE 1991/156-40,054



25. BARKER DAM/WALL STREET MILL TRAILHEAD
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,044



PARKING AREA

- 5 CARS / 2 RV'S
- INTERPRETIVE EXHIBIT TO USE AERIAL PHOTOGRAPHY TO ORIENT VISITORS TO THIS AREA.

PROPOSED PAVEMENT

100 0 100 FEET NORTH

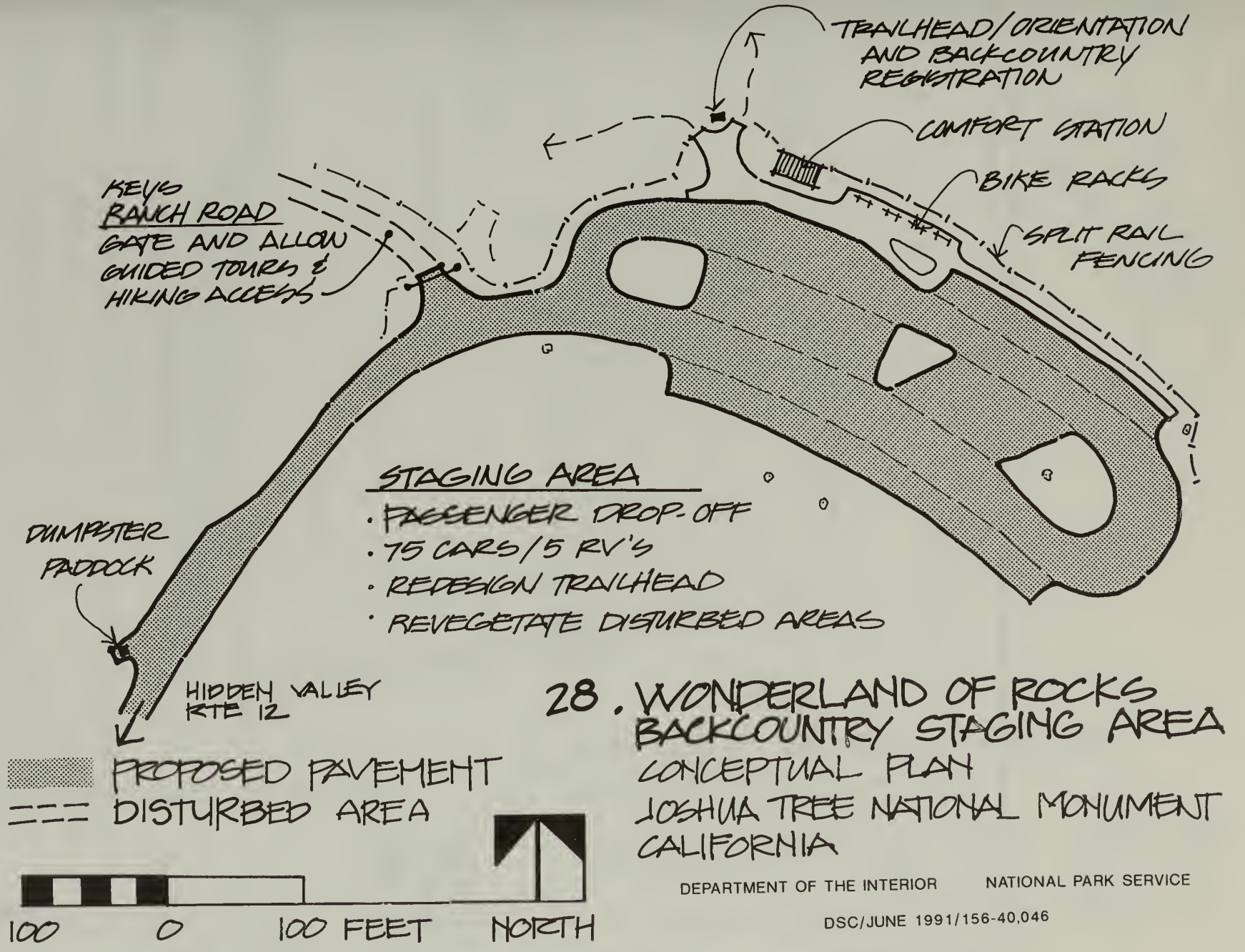
26. WONDERLAND OF ROCKS INTERPRETIVE EXHIBIT

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,045



28. WONDERLAND OF ROCKS BACKCOUNTRY STAGING AREA

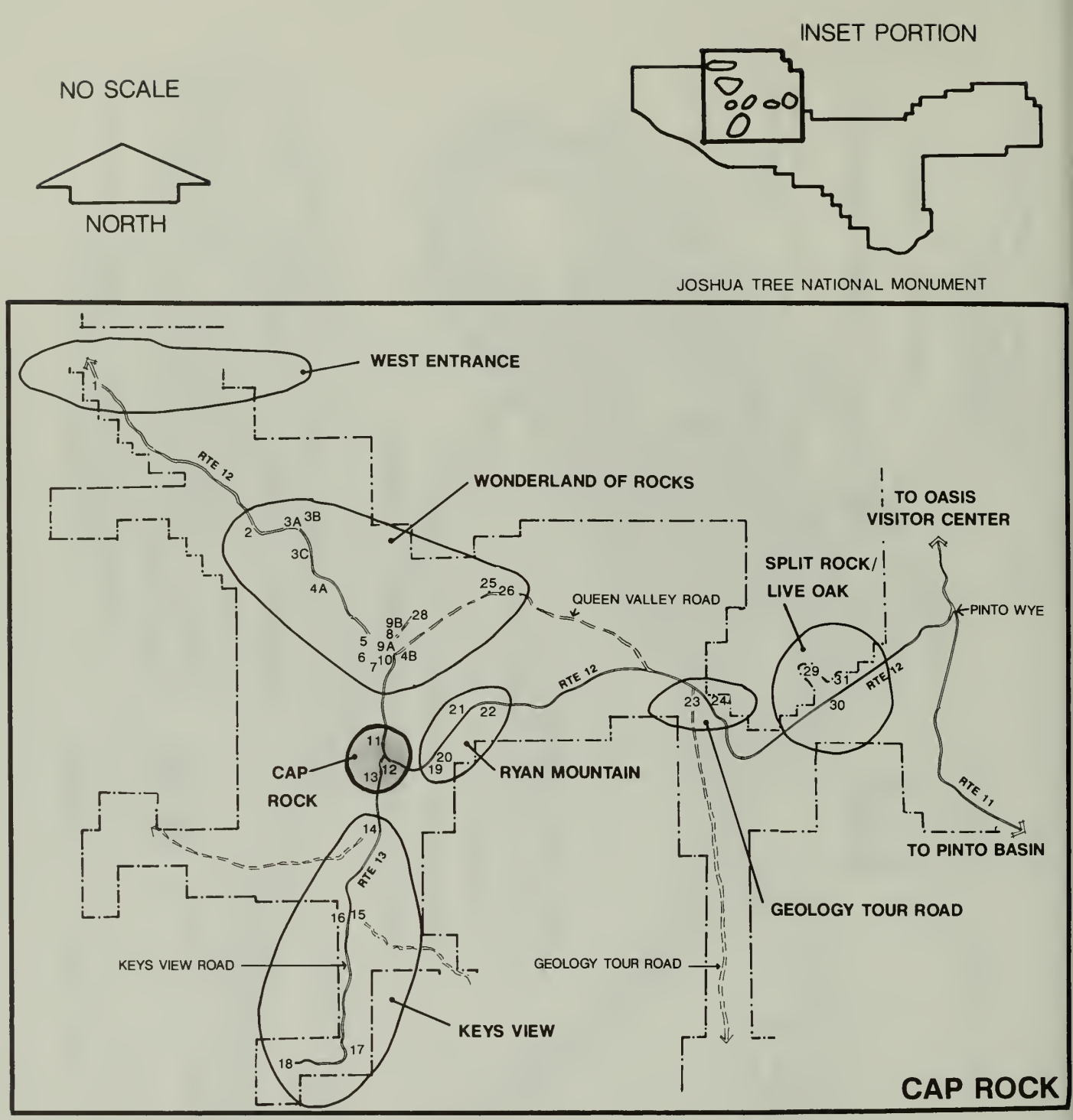
CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,046



LEGEND

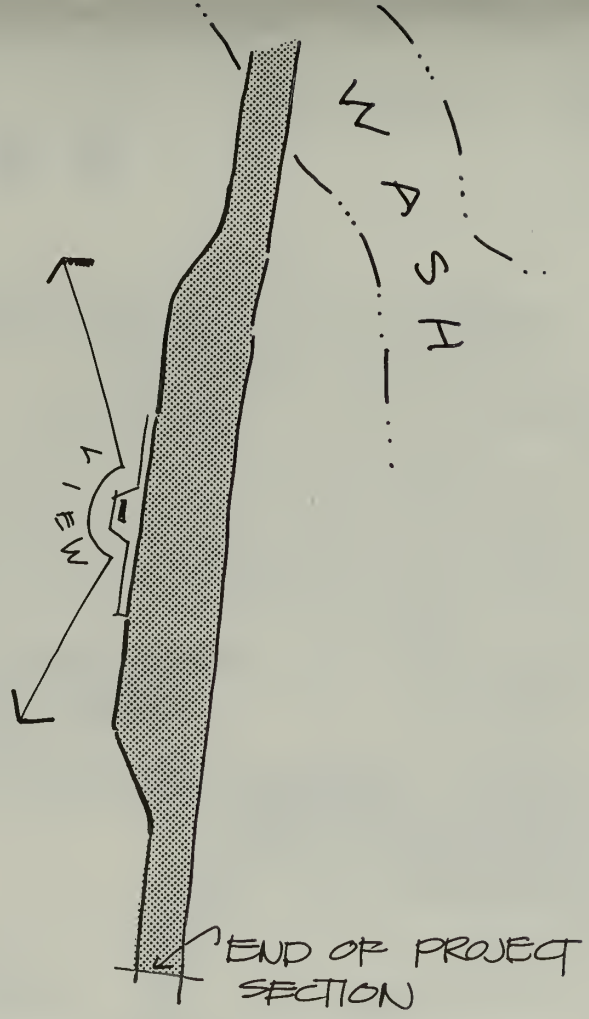
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAPS PAGES 55 TO 57

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,049



PARKING

- 5 CAR / 2 RV
- EXHIBIT TO INTERPRET 4 OR 5 SPECIES OF MOJAVE DESERT PLANTS FOUND AT THIS SITE.

PROPOSED PAVEMENT

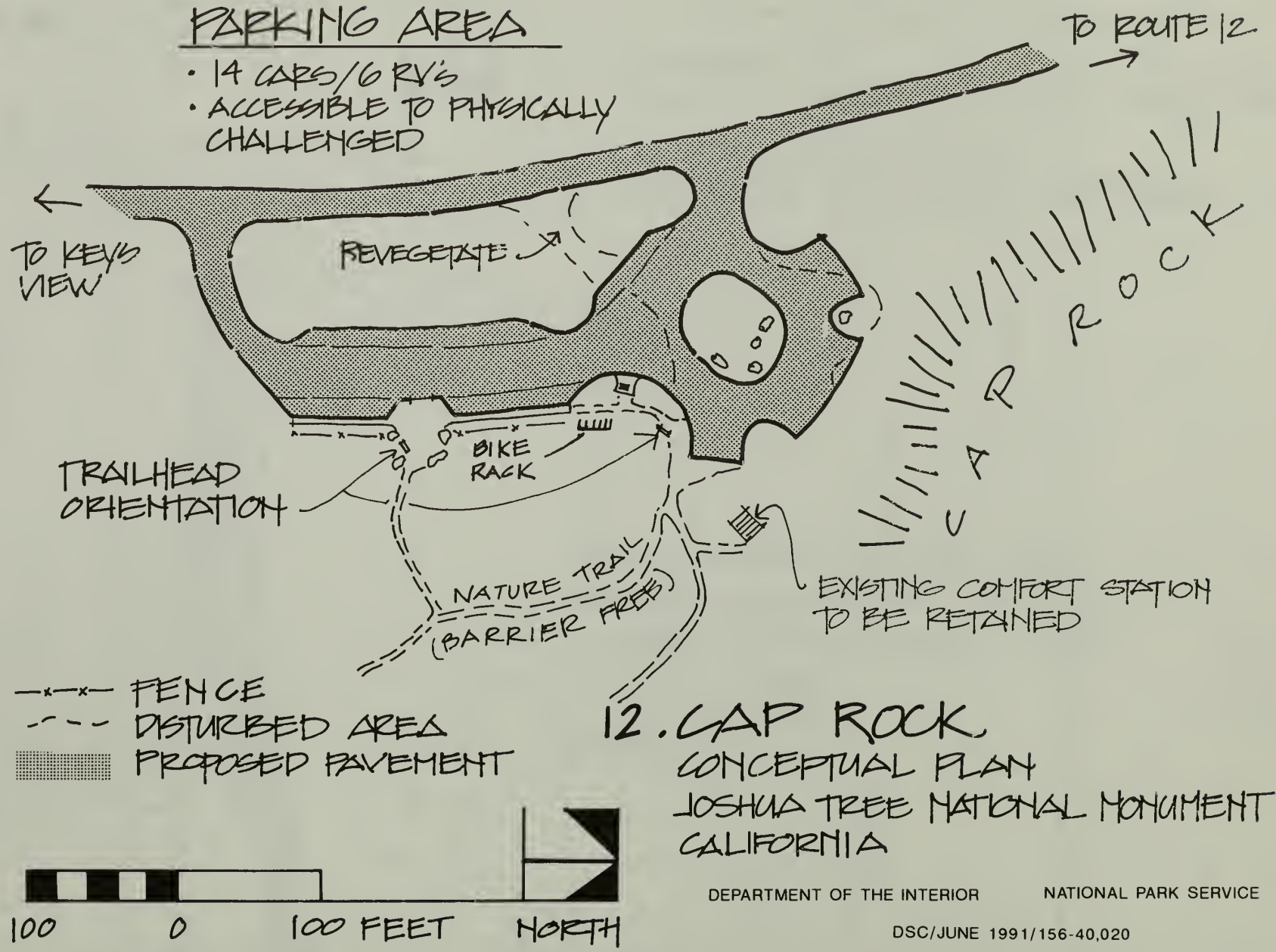
100 0 100 FEET NORTH

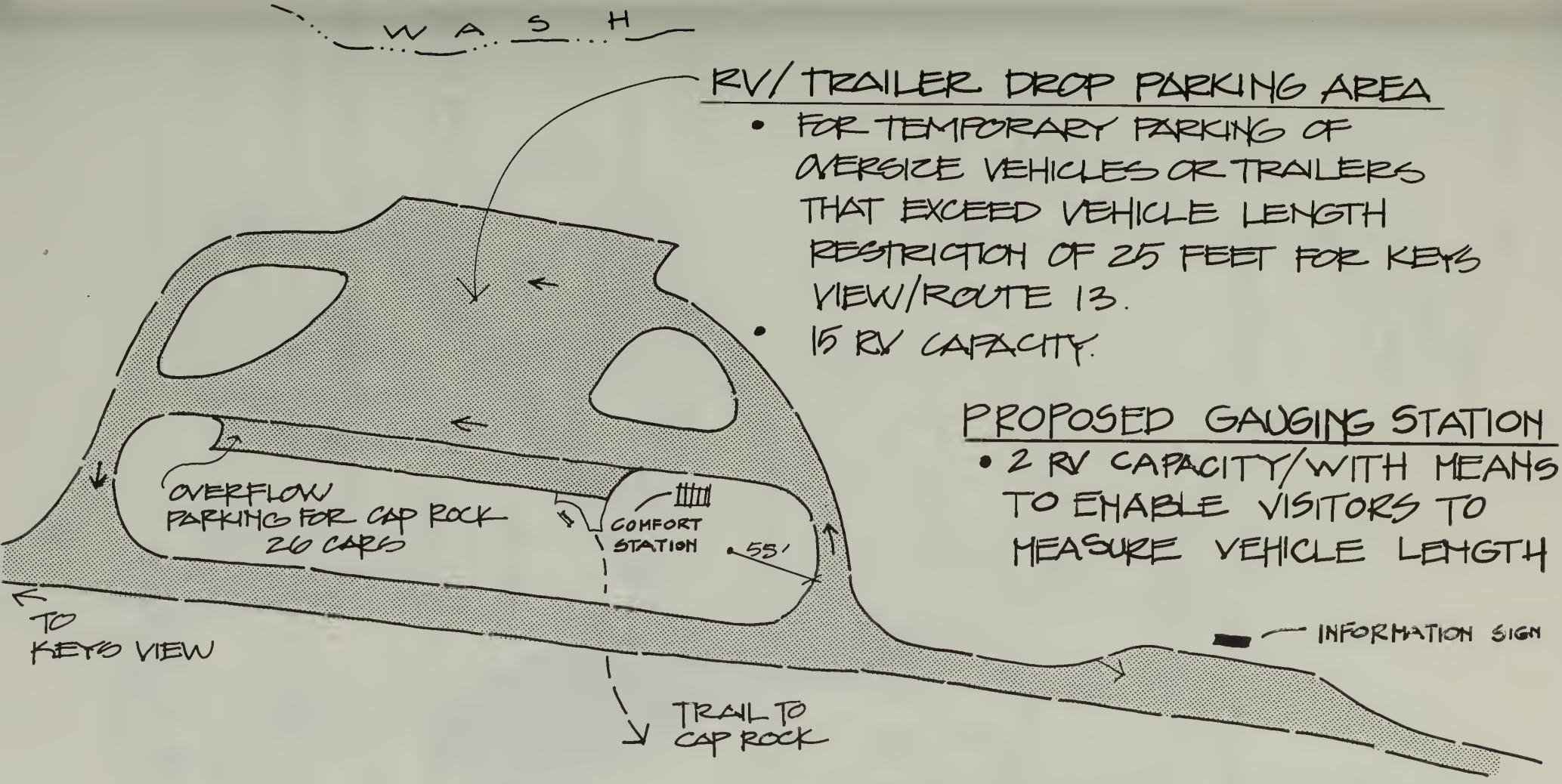
11. MOJAVE PLANTS EXHIBIT
CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,033


PARKING AREA
• 14 CARS/6 RV's
• ACCESSIBLE TO PHYSICALLY CHALLENGED
TO ROUTE 12
TO KEYS VIEW
REVEGETATE
CAP ROCK
BIKE RACK
TRAILHEAD ORIENTATION
NATURE TRAIL (BARRIER FREE)
EXISTING COMFORT STATION TO BE RETAINED
FENCE
DISTURBED AREA
PROPOSED PAVEMENT
100 0 100 FEET NORTH
12. CAP ROCK
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA
DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE
DSC/JUNE 1991/156-40,020


WASH
RV/TRAILER DROP PARKING AREA
• FOR TEMPORARY PARKING OF OVERSIZE VEHICLES OR TRAILERS THAT EXCEED VEHICLE LENGTH RESTRICTION OF 25 FEET FOR KEYS VIEW/ROUTE 13.
• 15 RV CAPACITY.
PROPOSED GAUGING STATION
• 2 RV CAPACITY/WITH MEANS TO ENABLE VISITORS TO MEASURE VEHICLE LENGTH
OVERFLOW PARKING FOR CAP ROCK 26 CARS
COMFORT STATION
55'
TO KEYS VIEW
INFORMATION SIGN
TRAIL TO CAP ROCK
PROPOSED PAVEMENT
100 0 100 FEET
NORTH

13. GAUGING STATION/RV DROP

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

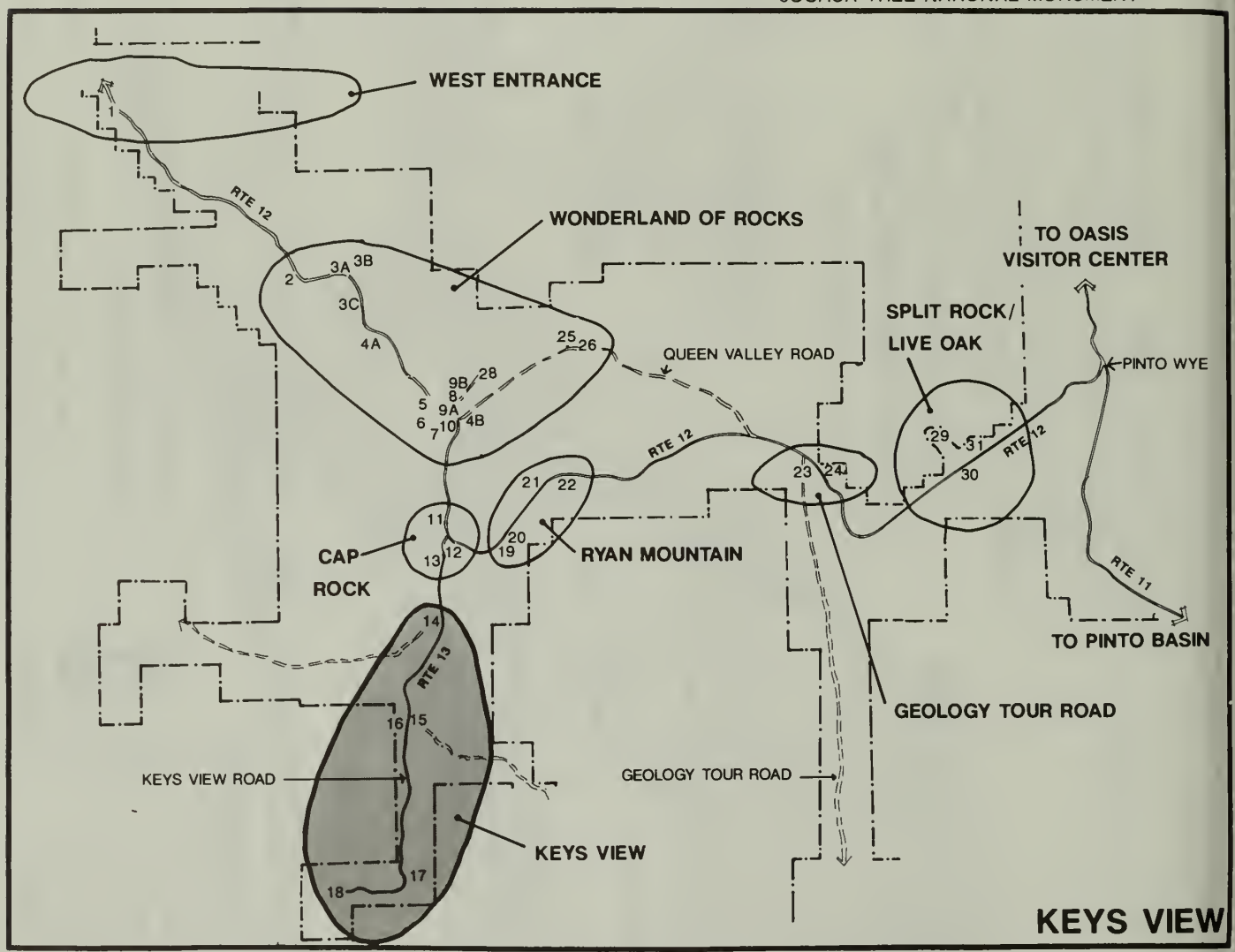
DSC/JUNE 1991/156-40,034

NO SCALE

NORTH

INSET PORTION

JOSHUA TREE NATIONAL MONUMENT



LEGEND

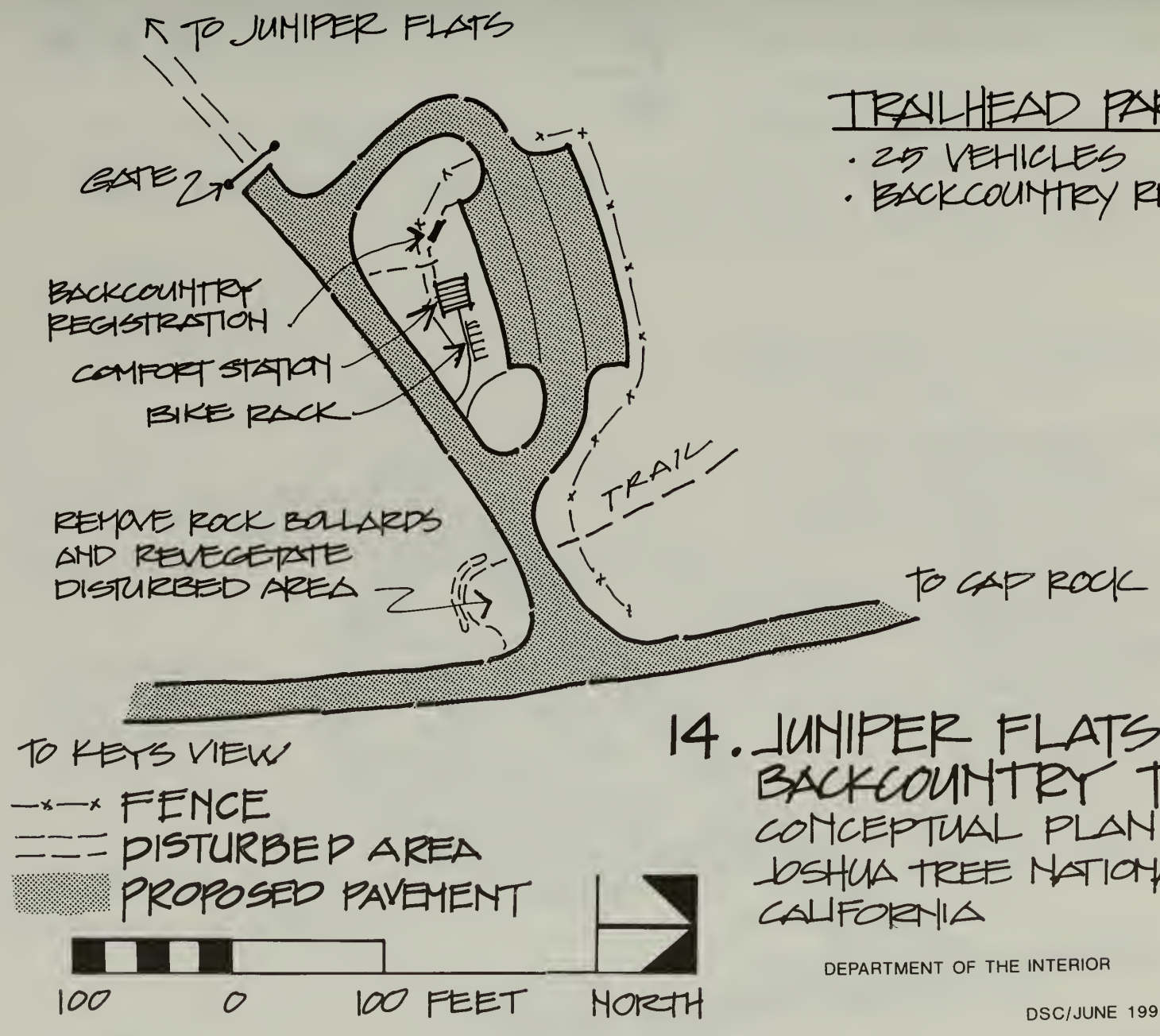
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAPS PAGES 59 TO 63

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,049



TRAILHEAD PARKING

- 25 VEHICLES
- BACKCOUNTRY REGISTRATION

14. JUNIPER FLATS BACKCOUNTRY TRAILHEAD

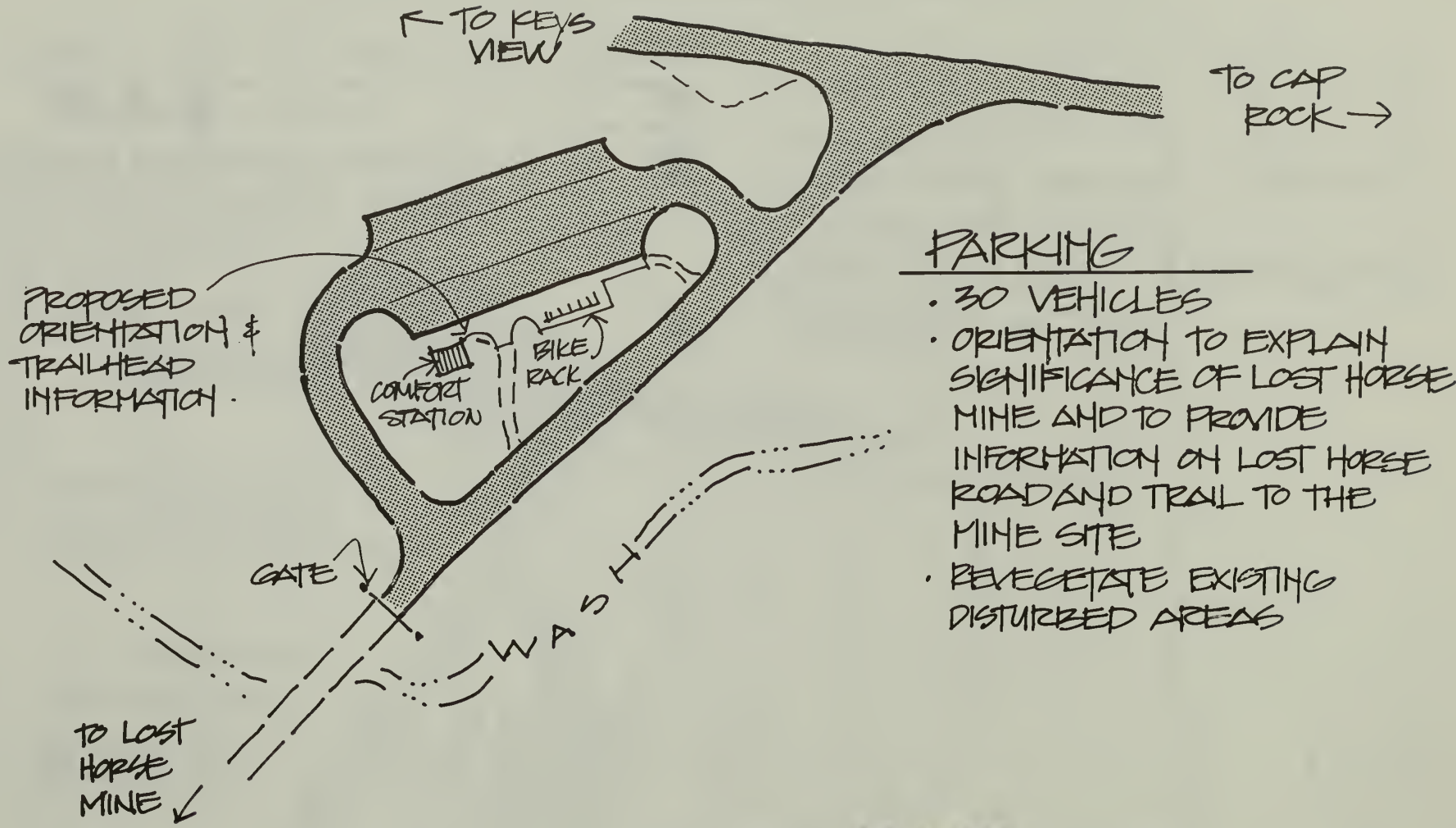
CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,035



PARKING

- 30 VEHICLES
- ORIENTATION TO EXPLAIN SIGNIFICANCE OF LOST HORSE MINE AND TO PROVIDE INFORMATION ON LOST HORSE ROAD AND TRAIL TO THE MINE SITE
- REVEGETATE EXISTING DISTURBED AREAS

PROPOSED PAVEMENT

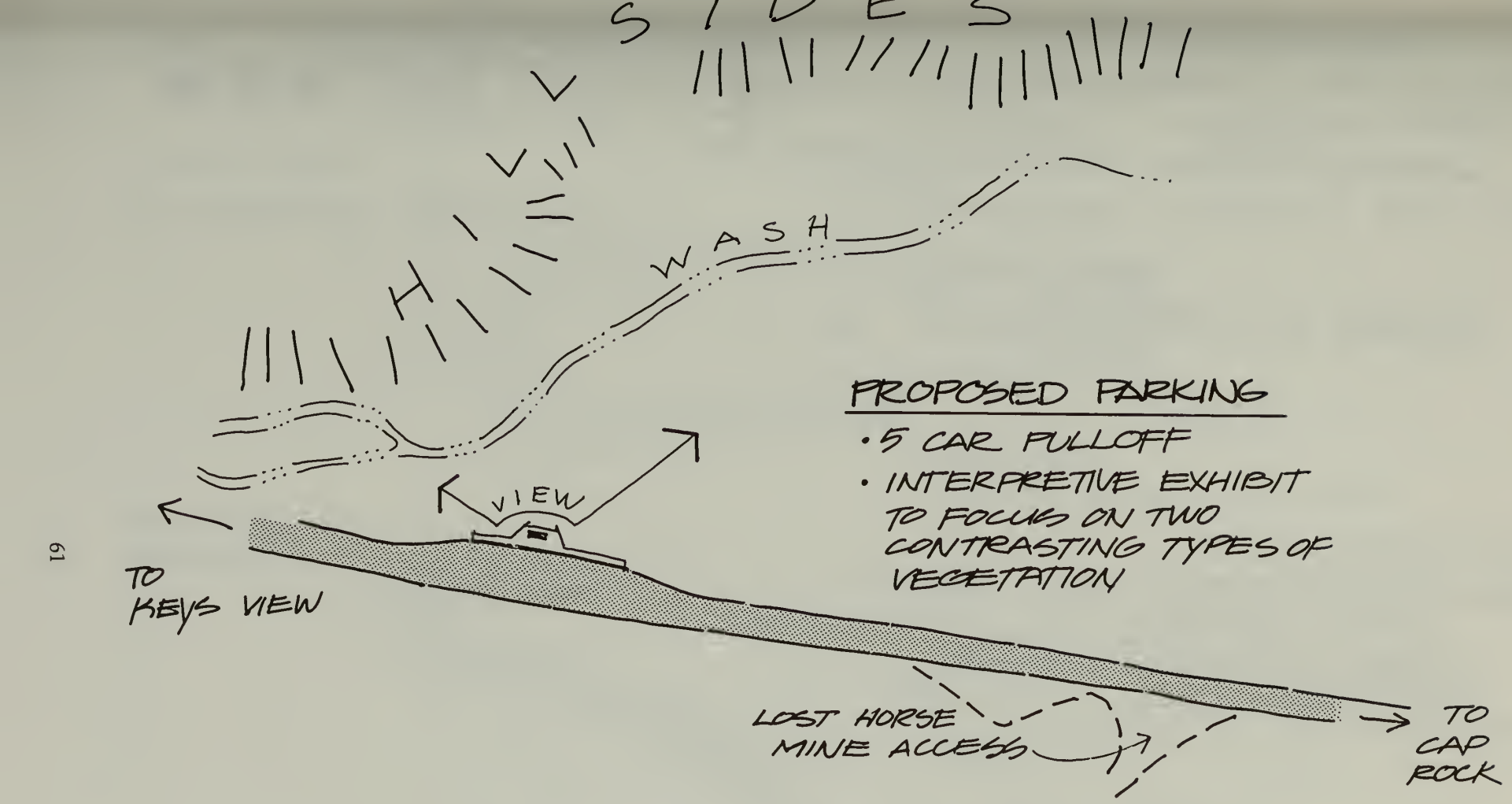
DISTURBED AREA

100 0 100 FEET NORTH

15. LOST HORSE MINE
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,036



=== DISTURBED AREA
▒▒▒ PROPOSED PAVEMENT

100 0 100 FEET NORTH

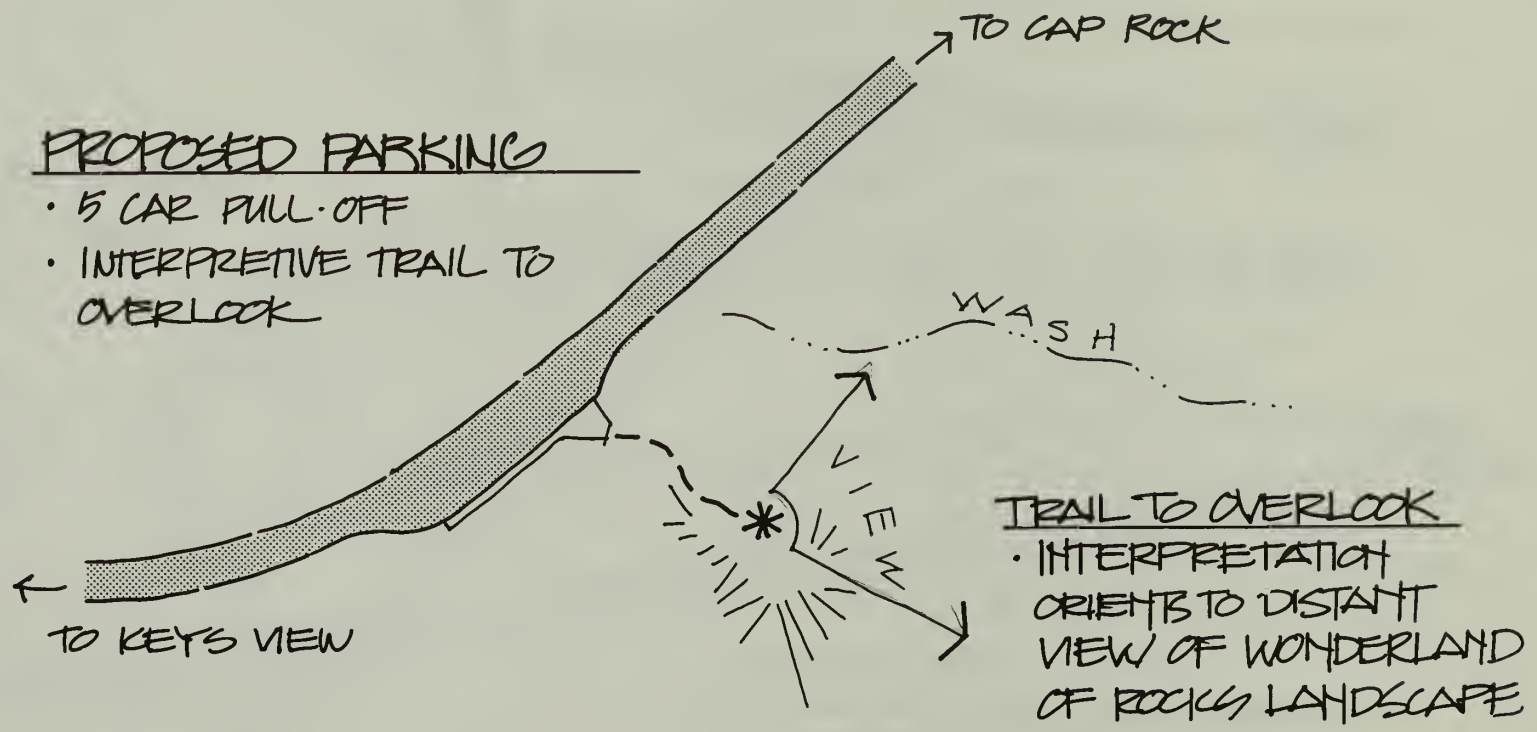
16. BLACK BRUSH HILLSIDES

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,037



PROPOSED PAVEMENT

100 0 100 FEET NORTH

17. WONDERLAND OF ROCKS OVERLOOK

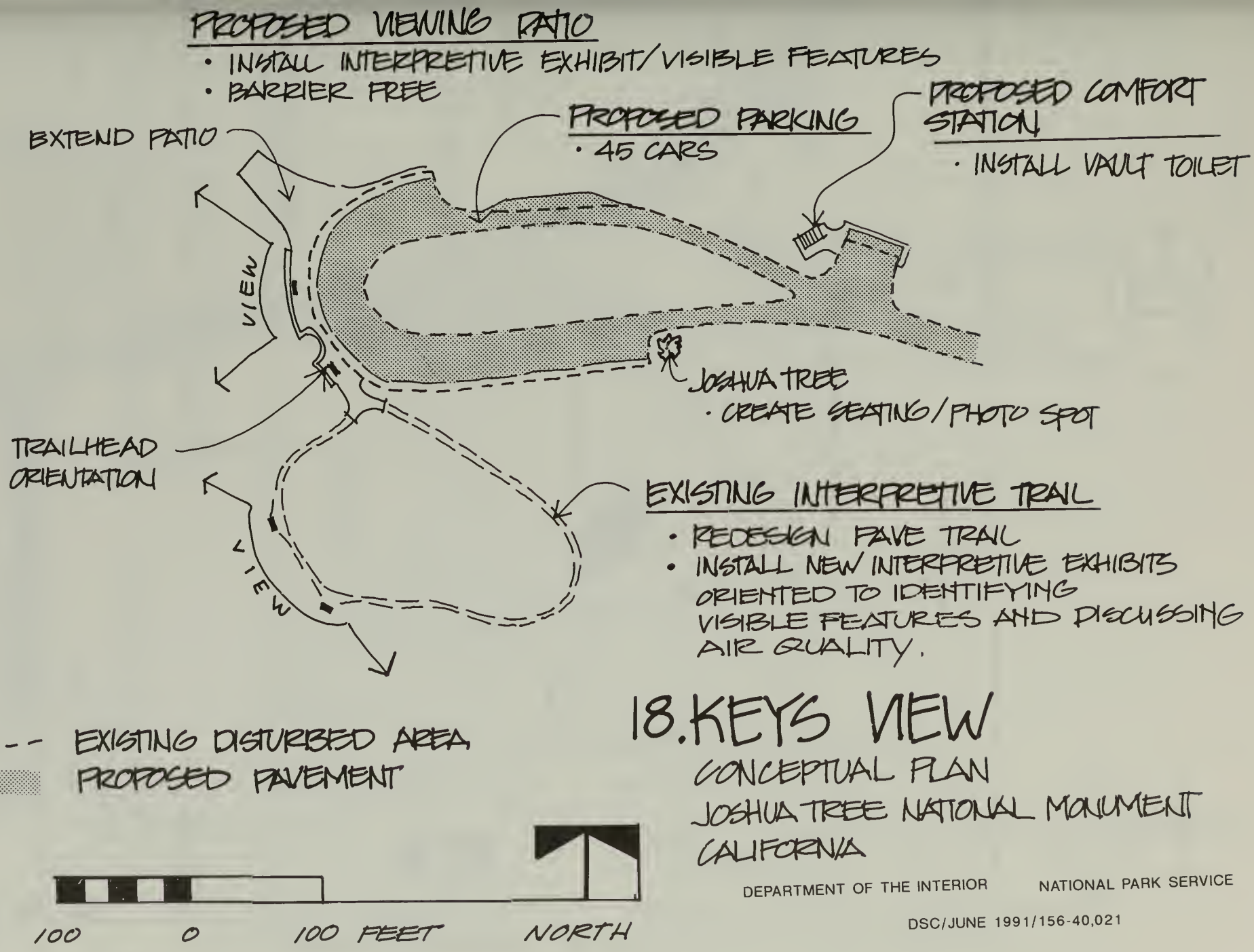
CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,038



18. KEYS VIEW

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

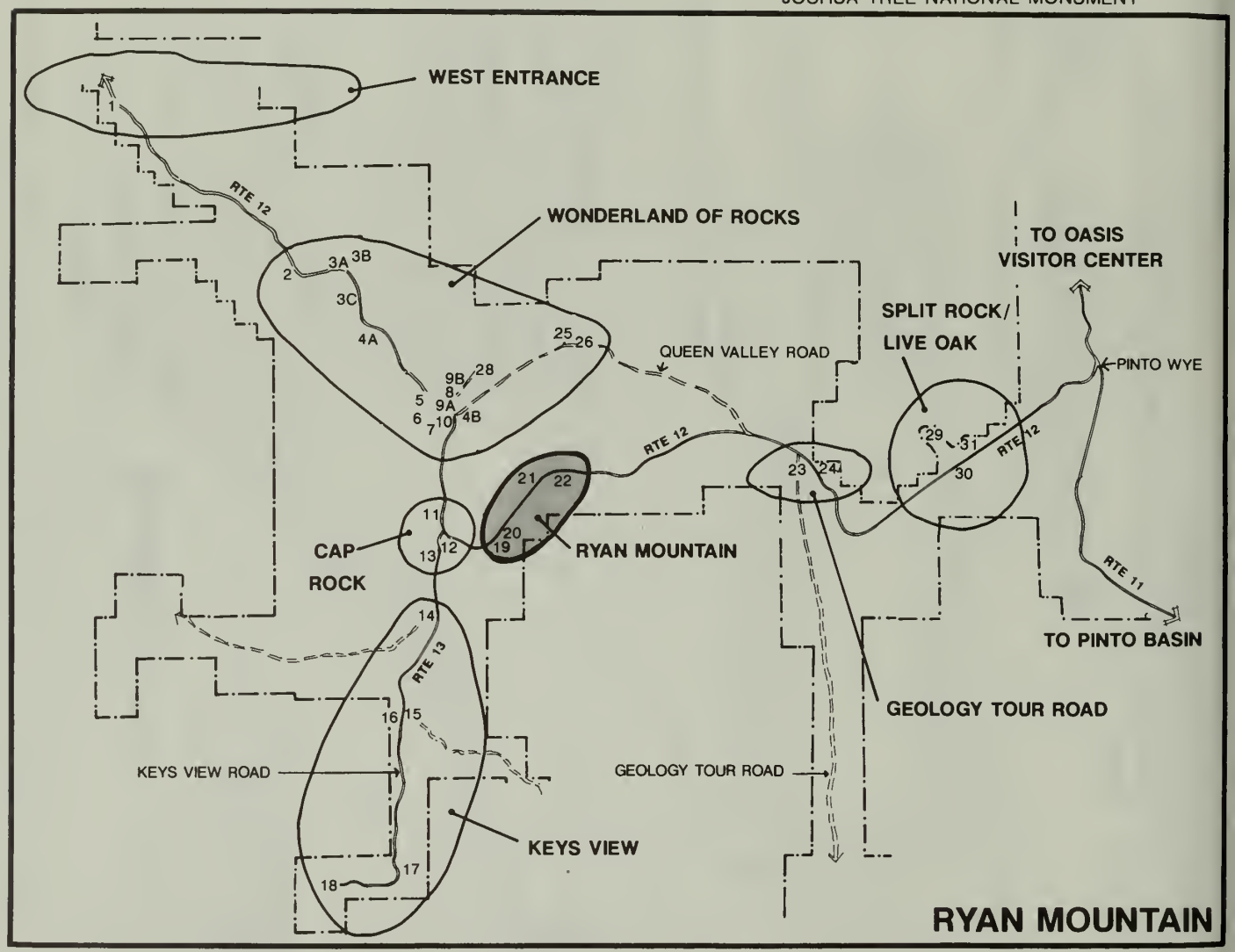
DSC/JUNE 1991/156-40,021

NO SCALE

NORTH

INSET PORTION

JOSHUA TREE NATIONAL MONUMENT



LEGEND

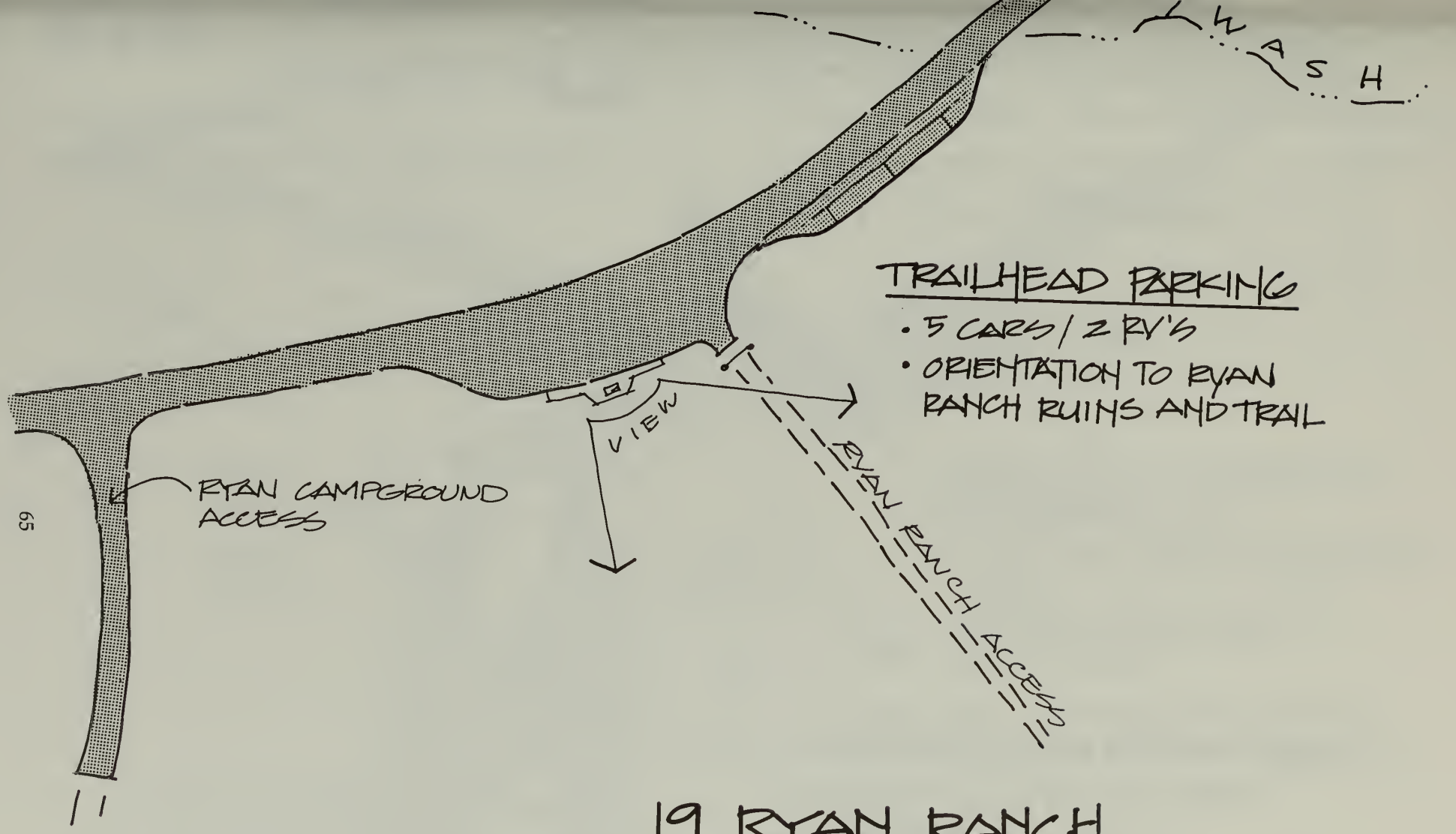
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAPS PAGES 65 TO 67

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

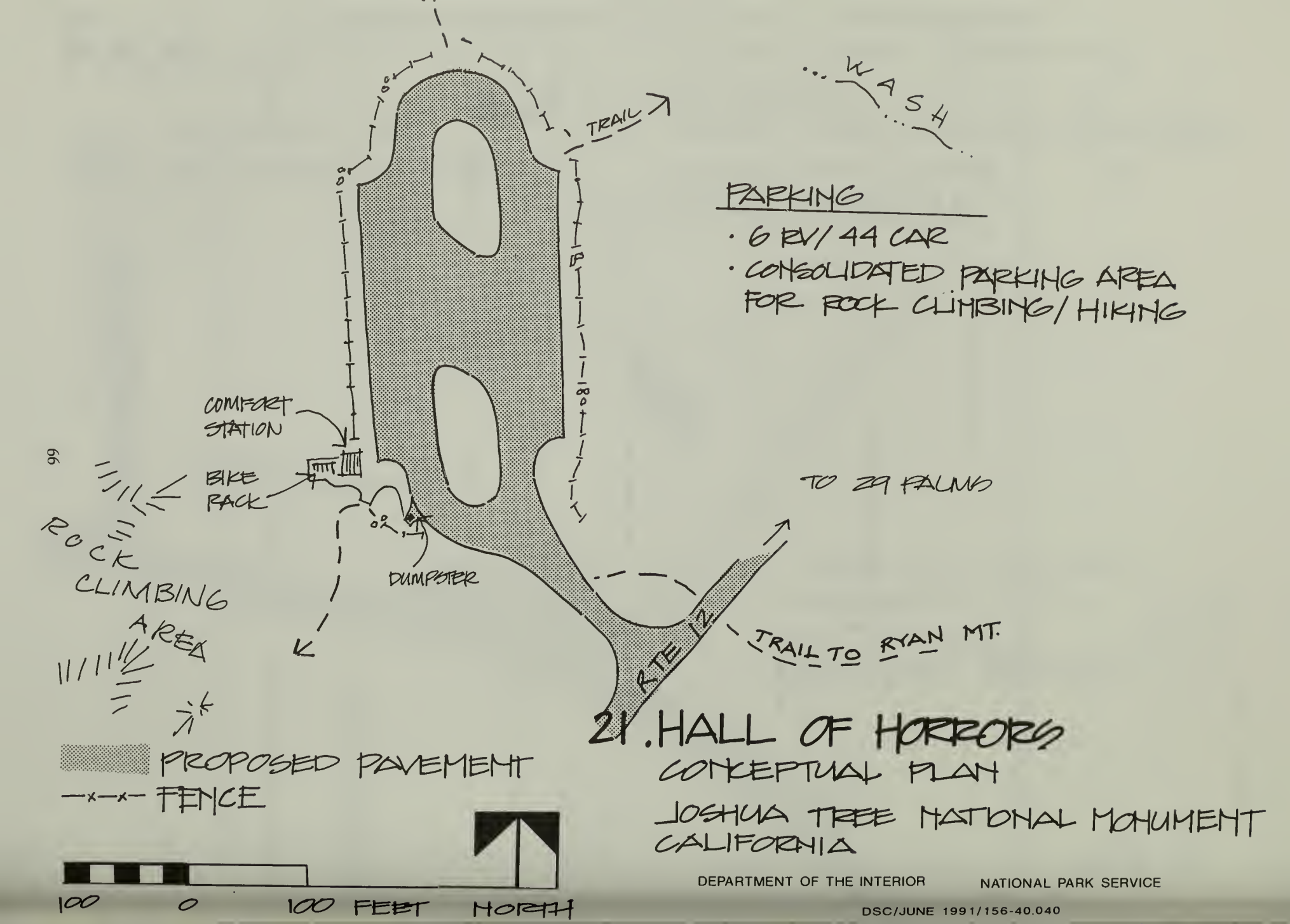
DSC/JUNE 1991/156-40,049



19. RYAN RANCH
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,039



99 66

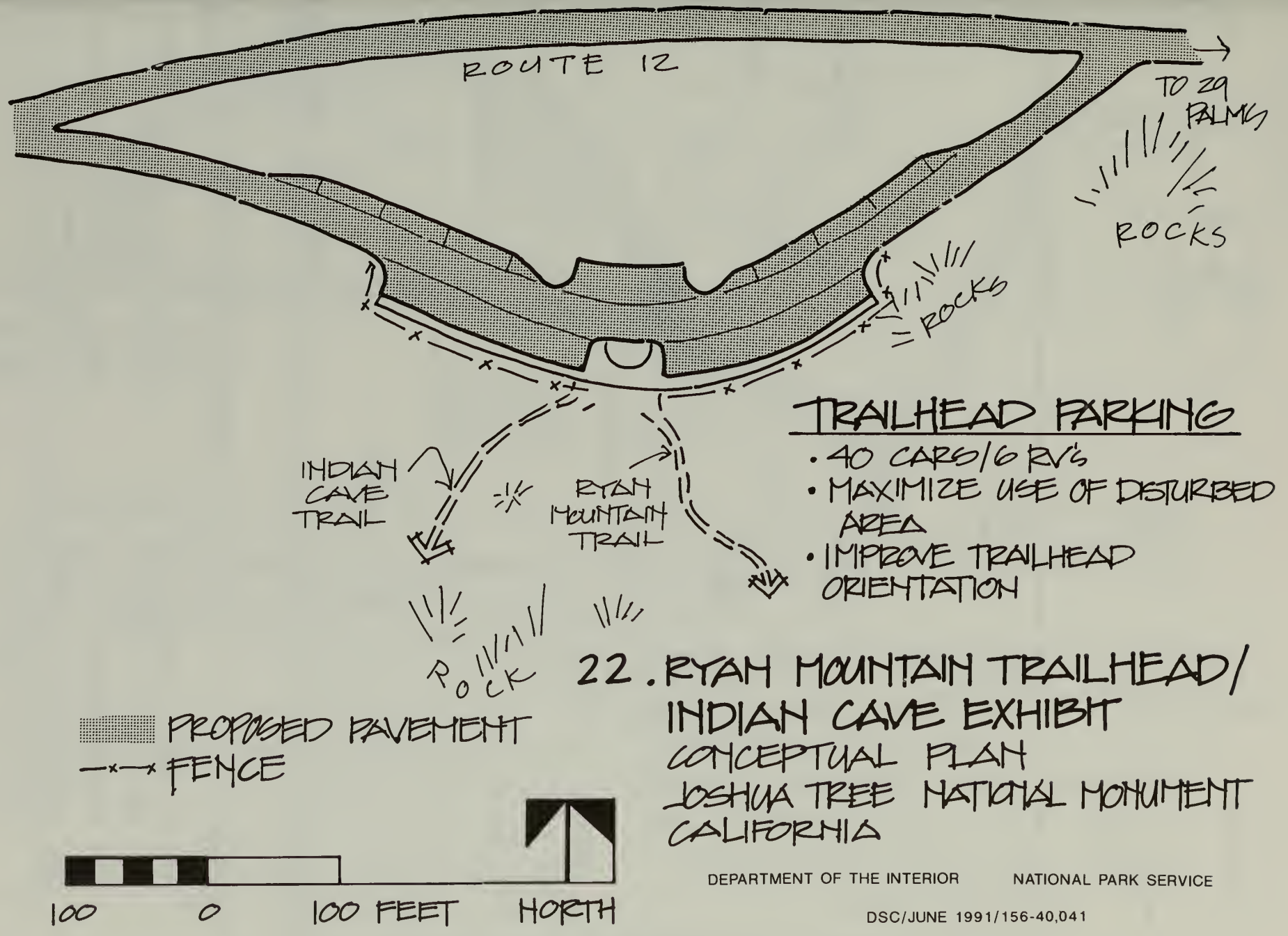
21. HALL OF HORRORS

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40.040



22. RYAN MOUNTAIN TRAILHEAD/ INDIAN CAVE EXHIBIT

CONCEPTUAL PLAN

JOSHUA TREE NATIONAL MONUMENT

CALIFORNIA

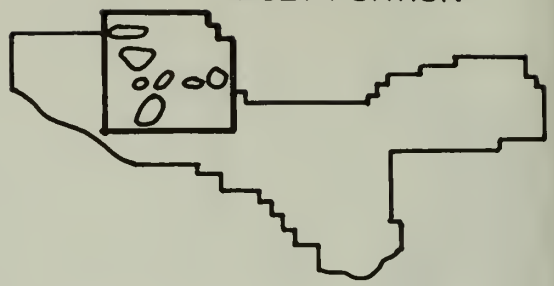
DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,041

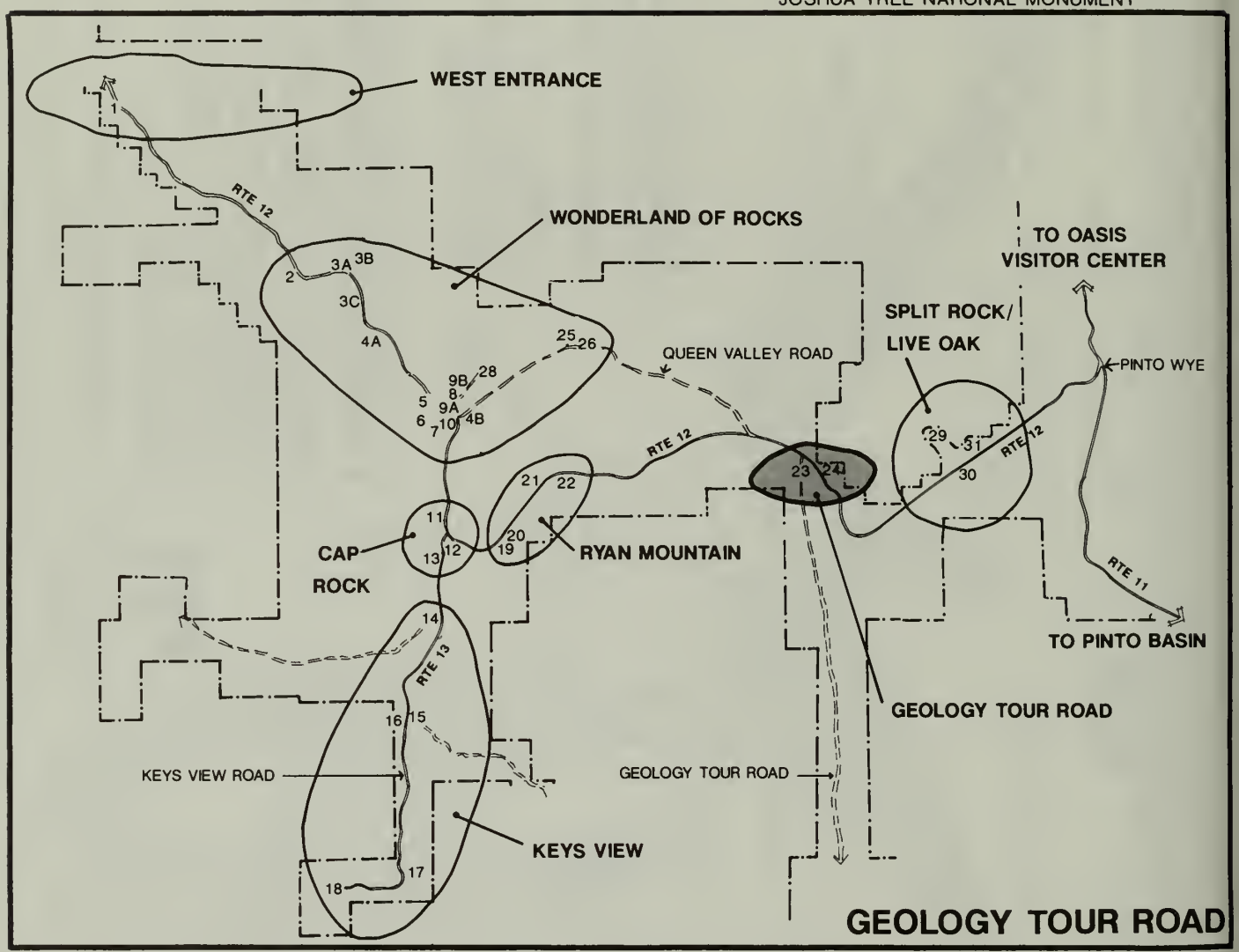
NO SCALE

NORTH

INSET PORTION



JOSHUA TREE NATIONAL MONUMENT



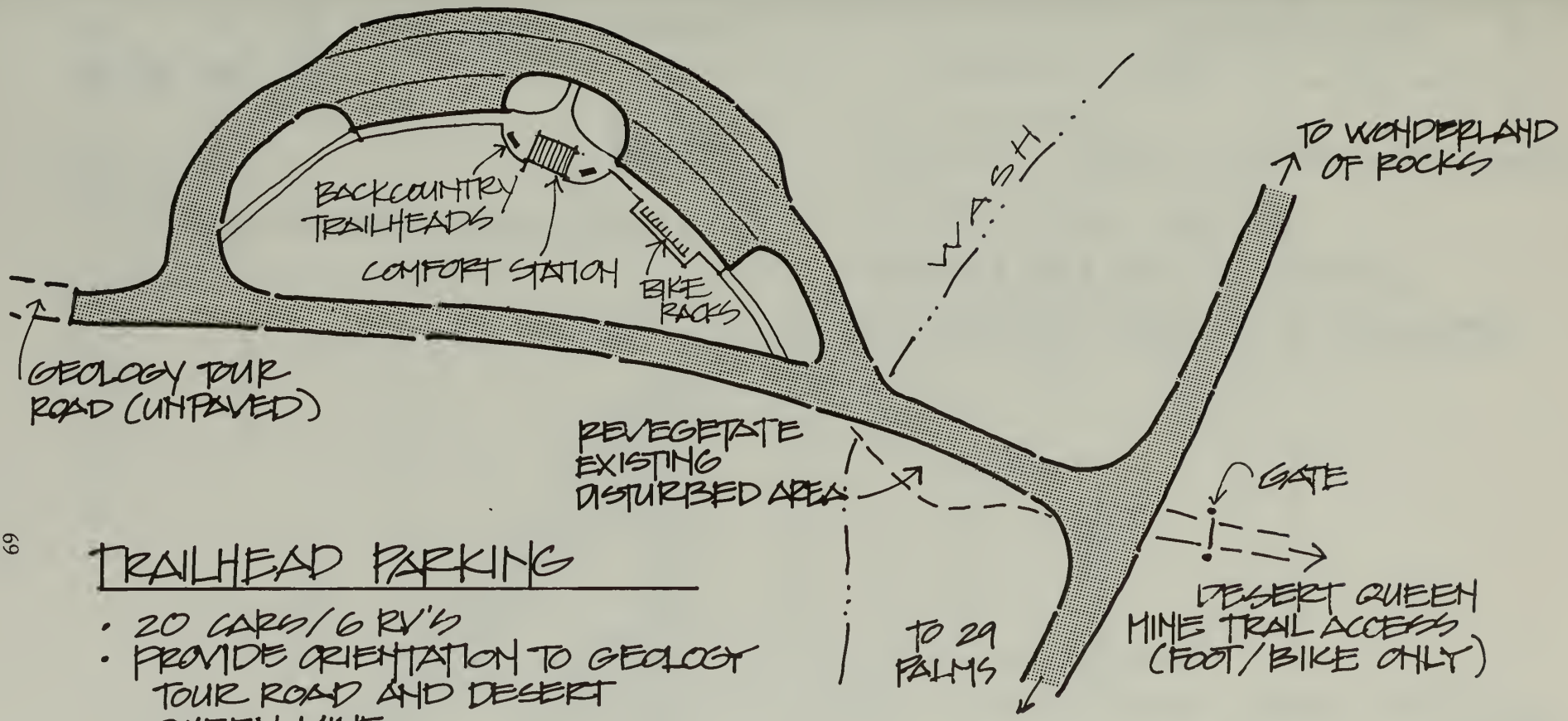
LEGEND

- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAPS PAGES 69 TO 70

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
DSC/JUNE 1991/156-40,049



TRAILHEAD PARKING

- 20 CARS/6 RV'S
- PROVIDE ORIENTATION TO GEOLOGY TOUR ROAD AND DESERT QUEEN MINE.

PROPOSED PAVEMENT

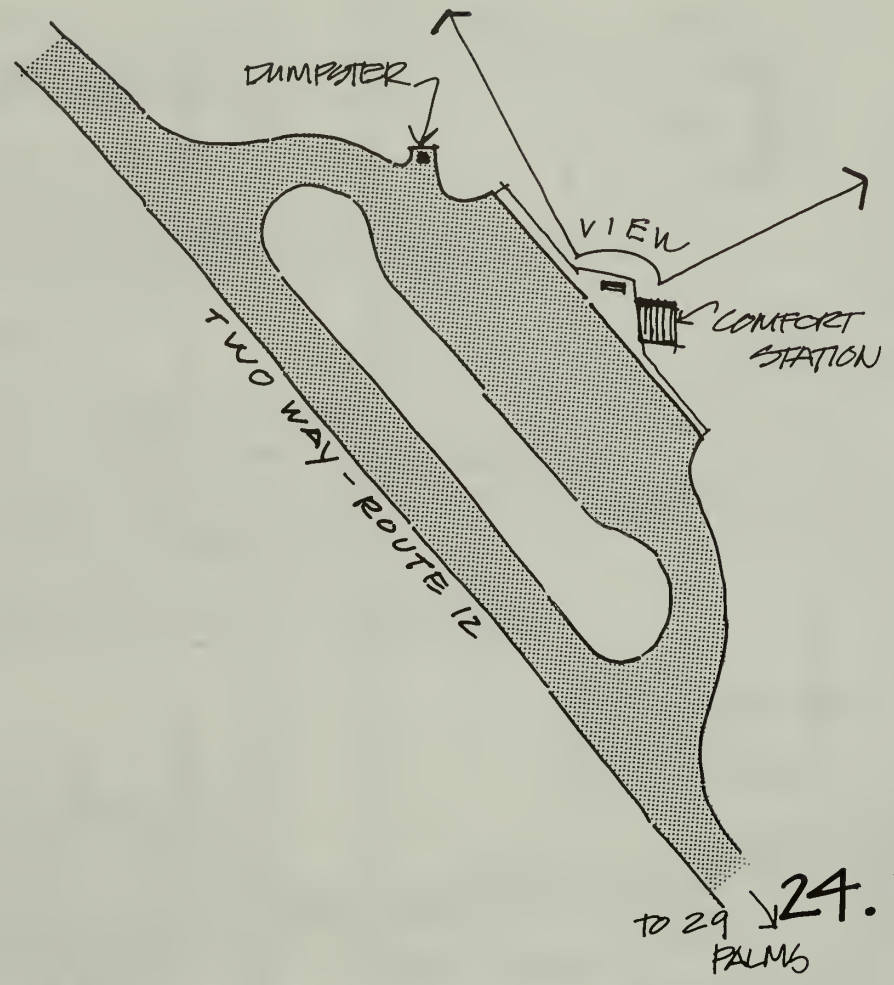
100 0 100 FEET NORTH

23. GEOLOGY TOUR ROAD/DESERT QUEEN BACKCOUNTRY TRAILHEAD

CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,042



PARKING AREA

- 15 CARS / 3 RV's
- ORIENTATION / INFORMATION ON OPPORTUNITIES IN WONDERLAND OF ROCKS AREA, FOR GEOLOGY TOUR ROAD, AND PARK ROADS IN GENERAL.

24. WONDERLAND OF ROCKS ORIENTATION - EAST

CONCEPTUAL PLAN

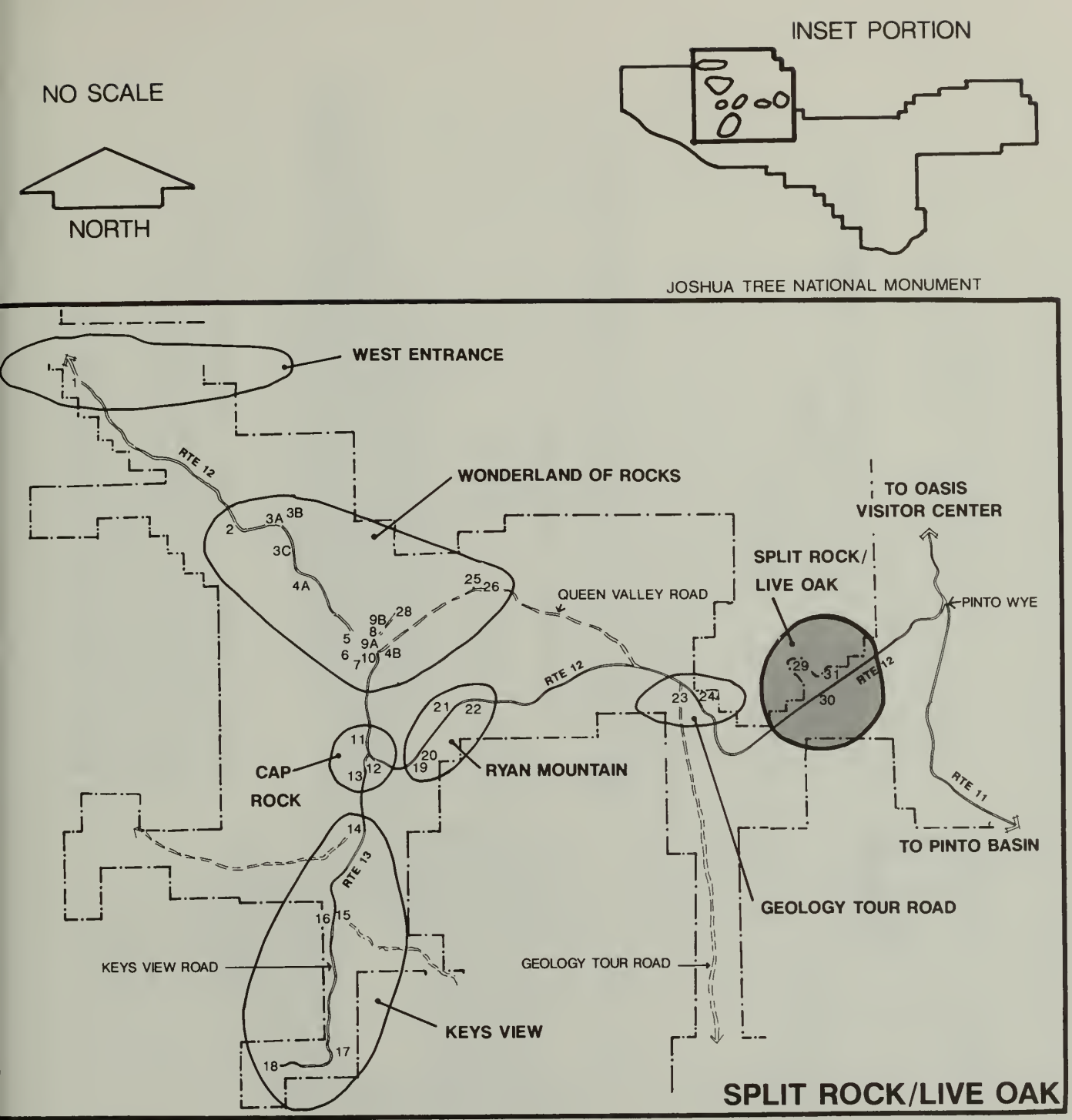
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

PROPOSED PAVEMENT

100 0 100 FEET NORTH

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,043



LEGEND

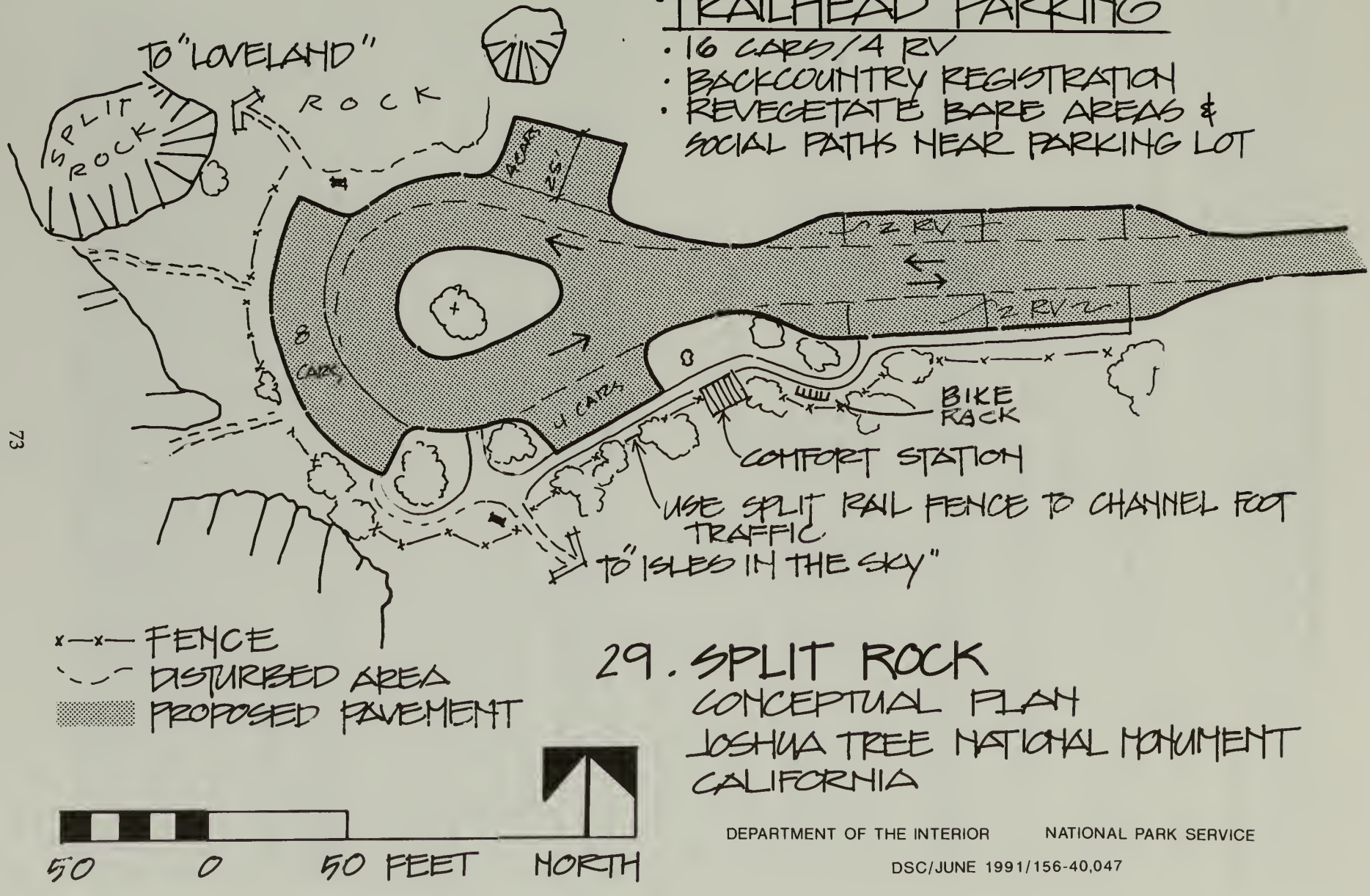
- WILDERNESS BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- #'s CORRESPOND TO AREAS IDENTICAL ON TABLE PAGE 32 AND MAP PAGE 73

ASSOCIATED VISITOR USE AREAS

JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,049



29. SPLIT ROCK
CONCEPTUAL PLAN
JOSHUA TREE NATIONAL MONUMENT
CALIFORNIA

DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

DSC/JUNE 1991/156-40,047

NO ACTION

Impact on Vegetation

Under this alternative, native vegetation, including Joshua trees along the road corridors would not be affected.

Impact on Visitor Experience, Park Management, and Safety

Visitor safety would continue to be a major concern. As the roadway continued to deteriorate, the number of accidents, serious injuries, and fatalities could be expected to increase. These currently average 34 per year, two per month, and one every four months, respectively.

The roadway widths and structural support would continue to be deficient. As the roads continue to deteriorate maintenance requirements would continue to escalate, though it is highly unlikely that maintenance funds or personnel would increase significantly. Thus, the deteriorating roads would increase public inconvenience, traffic and pedestrian safety risks, and natural resource impacts.

The visitor experience would continue unchanged in this alternative.

Impact on the Desert Tortoise

Generally, any roadway has impacts on native wildlife populations in the form of roadkills. However, possibly because estimated tortoise densities are so low in the project area, no roadkills have been reported on the existing roadway. As a result, this alternative would have no additional effect on the desert tortoise.

Impact on Cultural Resources

This alternative would have no additional impact on cultural resources.

ALTERNATIVE A (PREFERRED)

Impact on Vegetation

Since the project area is in some of the finest Joshua tree stands in the monument, a survey of trees potentially affected by construction was conducted. The construction area surveyed was 20 feet either side of the center line for all road segments. This was based on recent reconstruction of other segments of Route 12 and includes both paved and unpaved portions of the proposed roadway prism. Non-salvageable trees were classified as those in the paved portion which were too large to be transplanted. All trees in the unpaved portion of construction were considered for salvage either by transplanting,

if size permitted, or for mitigation in place. The mitigation measure is basically a rip-rap well around standing trees or groups of trees. The survey data reported here represent estimates and are optimistic in terms of salvage potential. It is estimated that approximately 40 percent of the trees marked for mitigation or transplanting will not survive. This should be understood when reviewing the data with respect to the various options and alternatives.

The impact of this alternative on Joshua trees is summarized in the following table:

Routes 12 and 13				
			Non-Salvage	
Road Segment	Total Trees Affected	Salvage Mitigate/Transplant	Trees Lost*	Large Trees**
1	26	23	12	7
2	0	0	0	0
3	27	22	14	7
4	37	27	21	14
5	54	38	16	0
6	126	109	61	24
7	0	0	0	0
Total	244	196	124	52

* Includes total number of trees occurring in paved portions that are too large to be transplanted and an estimate of 40 percent loss from those trees eligible for transplanting or mitigation.

** Number of trees (included in the total) that are too large (typically more than 12 feet high and branched) to be transplanted or mitigated in place. They do not represent the large and unique photogenic roadside trees that are popular with the public – none of these trees are affected.

A total of 244 Joshua trees would be affected by the road reconstruction in this alternative. Of these, 124 trees, 52 of which are large individuals, would not be expected to survive. The remaining 120 trees would be mitigated in place or transplanted with a tree spade and expected to survive. As shown in the table, the greatest impact on the Joshua trees occurs in segment 6. If a narrower road width option were selected for segment 6, the number of Joshua trees affected could be reduced by 25 (see Appendix A). The impact on the Joshua trees has been eliminated in segments 2 and 7.

As discussed in the Affected Environment section of this document, a native plants nursery is in the monument. Planting of nursery Joshua tree stock in areas disturbed by this project is a significant mitigating measure. The seed for these trees was collected within the monument and NPS has developed the technical expertise to plant such nursery-grown stock with very high survival rates. The nursery stock is at an age that it can survive the normal causes of young Joshua tree mortality, such

as feeding by rabbits and other small mammals. All Joshua trees lost will be replaced – although at a drastically reduced size – in this program. It will take hundreds of years for these trees to attain the size of the removed trees.

Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species.

Other salvageable species affected by the realignment include Mojave Yuccas (75 individuals), Parry's Nolina (1 individual), and various cacti (275 individuals). Survival rates for transplants of this group as a whole are approximately 75 percent. Fifty-five Pencil Cholla also occur within the proposed corridor and previous experience indicates that these individuals seldom survive transplanting.

Additionally, 87 individuals of *Juniperus californica* were noted along Route 13 to Keys View. Many of these junipers are large, noble individuals that cannot be transplanted due to their size and configuration. All of these trees will be saved through maintaining the same roadway alignment and width for this route.

Non-salvageable species are replanted with nursery grown specimens developed in the monuments native plants nursery. Accomplishments in desert revegetation at Joshua Tree National Monument have received national recognition. On prior FLHP projects, visual recovery of disturbed sites has been accomplished in 3-7 years as compared to decades or longer if left to natural processes.

Impact on Visitor Experience, Park Management, and Safety

The current visitor experience, of driving through a desert forest on a narrow road, will be maintained by making 4.0 miles of Route 12 (segment 2) and all 5.0 miles of the Queen Valley Road (segment 5) a one-way road, maintaining the same roadway alignment and width, and restricting large vehicles from Route 13. Since Joshua trees are distributed rather evenly through this section of the monument, visitors should not notice where they have been removed to provide for the roadway. The visitor driving experience will be the same or enhanced (one-way segments) on the roadway. On the one-way routes, the experience will be more relaxing since visitors can spend more time enjoying the scenery and forget about oncoming traffic.

The effect on visitor experience is not, however, solely a one way affair. Looking at the traffic flow through the area, a possible problem will occur with one-way flow of traffic. Vehicles traveling from east to west would have to go an additional 3.25 miles through the Hidden Valley area to get to Ryan Campground. In order to proceed from points immediately east of Ryan Campground to Keys View, a popular overlook, one would have to make an easterly loop on Route 12 – an additional 10 miles.

Visitor experience will change by paving the Queen Valley road and converting it to one-way. The road is currently used to access other dirt roads to more remote sites in the Queen Valley and Wonderland of Rocks areas. Paving will allow more visitors to experience areas of the monument not currently available on paved roads. More convenient access to additional climbing areas may also be possible, thereby reducing the pressure on some of the more popular climbing areas such as Hidden Valley. Paving, along with the increase in visitor use it will likely bring, will however detract from the experience of those visitors who prefer the rustic appeal of a lightly used dirt road. There are many other opportunities throughout the monument for this more rustic experience.

The one-way system will also prevent rockclimbers from moving among sites as easily as they currently do. To mitigate this impact, a trails plan will be developed for the most direct, environmentally compatible routes among areas using existing abandoned roads or trails. Experimentation is planned to harden these routes with an environmentally compatible compound to accommodate mountain bike use.

The widening of road segments 1, 3, 4, and 6 (5.7 miles) would also change the visitor experience. This change is illustrated in the following two photographs. The first photograph shows what the experience is like today with the narrow roadway. The second photograph (taken on a recently reconstructed section of route 12) shows what the roadway would be like after reconstruction. As illustrated, the experience of driving through a desert forest on a narrow road would be lost on these road segments.

Each reconstructed road will have a structural base which provides support through paved shoulders (wide segments) or below pavement (narrow segments). This structural base will reduce maintenance, protect the initial capital investment of the road, ensure that the road will last for the normal 15 to 25-year service life, provide a smoother ride, and protect the road edge, which not only reduces maintenance but accident potential. All drainage will be improved with well designed low water crossings and/or curbs, self-cleaning culverts, lined ditches, armoured leading/trailing edges of low water crossings, etc. These improvements will substantially reduce the average annual maintenance requirements for these roads.

Visitor safety will improve since all roads will provide adequate width to accommodate large vehicles. With one-way alignment, the sight distance requirements are less and design speeds are easier to achieve with less cut and fill since the road can sit on the existing grade. There will be adequate turnouts to accommodate passing slower vehicles. Driving speed may actually decrease because the road would be recognized as a tour road rather than a destination route, discouraging through traffic. In summary, the numbers of accidents, serious injuries, and fatalities should all be substantially reduced from the no action alternative.

Finally, NPS experience with one way roads in other parks such as Acadia National Park in Maine has been very positive (Manning 1990). The major visitor use road in Acadia is a 20- mile loop road, half of which was converted to one-way about 10 years ago. Recently, the NPS proposed changing the remainder of the loop from two-way to one-way travel. This proposal met with significant concern from both visitors and local residents. So, as an experiment, the NPS changed the two-way road to one-way for a one-week period and surveyed visitor reactions to the change.

Motorists were asked to evaluate the road system for traffic congestion; safety; ability to stop, park, and view the scenery; ability to relax and enjoy the park; problems in getting stuck behind slow vehicles; pleasantness of the trip; attractiveness of the road; frequency of pulling over to stop and enjoy the park; and inconvenience. It was clear from the results of the study that the one-way traffic pattern substantially enhanced the quality of the park experience for visitors. Motorists rated traffic congestion and safety conditions as better under one-way than two-way. They also reported that they stopped more often to enjoy the park and felt that their ability to stop, park and view the scenery was enhanced with the one-way system. Inconvenience to local residents was noted by a fairly small percentage of respondents. Based on this study, the proposed approach is believed reasonable for application in this case.

EXISTING ROADWAY

RECENTLY RECONSTRUCTED SECTION OF ROUTE 12

Impact on the Desert Tortoise

In 1989 and 1991, the road corridor was surveyed for evidence of the Desert Tortoise during the Joshua tree survey (discussed under the Impact on Vegetation section). Although the road corridor is in the tortoise habitat described in the Affected Environment section, no evidence of the tortoise was found. However, the survey was conducted during a period of depressed tortoise activity due to drought conditions, and road segment 5 was not surveyed at all. Since the only tortoise burrow found within the project area in the Karl 1988 survey was found on a transect south of this road segment 5, this area needed to be resurveyed. To verify the apparent absence of any tortoise, the entire project area was resurveyed during the peak of spring activity in 1991. One tortoise burrow was found on the realignment of the last 0.5 miles of the Queen Valley Road in the Hidden Valley area.

The paucity of tortoise sign can be explained by two factors. One, the existing road was poorly engineered and provides for no paved turnouts or parking areas. Motorists have used parallel parking along the entire roadway impacting vegetation far beyond the paved lanes thus eliminating some tortoise habitat. Second, the roads are more than 50 years old and even modest rates of roadkills (though none has been reported) could have depressed adjacent populations.

Although the road corridor is in tortoise habitat, these areas may not provide actual habitat and may not contain tortoises. Therefore, the term potential tortoise habitat is used in the discussions below.

This alternative would affect the following number of acres of potential desert tortoise habitat along the road corridor:

Estimated Number of Tortoises/km²*			
Segment	**0-7**	**1-7**	**8-29**
1	1.1	0.4	–
2	0.0	0.0	–
3	0.8	0.0	–
4	1.3	–	1.7
5	0.0	0.7	1.3
6	5.7	–	0.3
7	0.0	0.0	0.0
Total	8.9	1.1	3.3

*Road segments bordering more than one tortoise density category were placed in the higher density category.

Widening and realigning segments 1, 3, 4, 5, and 6 will result in the loss of 13.3 acres of potential tortoise habitat along the road shoulders. Of this total, 3.3 acres are in an area of moderate (8-29/km) tortoise density. The one-way road segment (2), since it will not be widened, should not affect desert tortoise habitat. Paving of the Queen Valley Road and increasing its traffic load could, however, lead to additional tortoise roadkills. Based on current experience, such roadkills can be expected to average less than one per year. On the other hand, since the vehicle speed on the one-way segments is expected to be less than current the number of road kills (0) should be maintained.

To mitigate construction impacts on the tortoise, surveys will be conducted in active construction areas. If tortoises are discovered, mitigation techniques approved by the USFWS will be employed.

With the implementation of this mitigation, the small area (13.3 acres) of habitat, and this acreage in low, 0-7/km^2, tortoise density, this alternative is unlikely to have an adverse effect on the species.

Impact on Cultural Resources

Under an agreement with the California State Historic Preservation Officer dated November 21, 1979, all NPS projects involving ground-disturbing activities will be evaluated on-site by a professional archeologist. If the project is found to have no effect on archeological sites, an archeological clearance is issued to document the finding. Archeological clearance number 008-86-JOTR was issued by the Western Archeological and Conservation Center on February 25, 1986, for that portion of the proposed road work from Cap Rock to Geology Tour Road, on Route 12. It was conditional upon the grade not being lowered in the vicinity of CA-RIV-1961, and limits road widening to the northeast shoulder of the road. Archeological clearance number 013-86-JOTR was issued on March 11, 1986, for that portion of the road between Cap Rock and the West Entrance of the Park. It is also conditional upon the grade not being lowered in the vicinity of sites CA-RIV-1940 and -1942, and restricts road widening to the east side of the road in the vicinity of site -1940 and to the south side of the road in the vicinity of -1942. Both clearances require the presence of an archeologist on site during construction activities. These conditions will be adhered to.

All other portions of this project have been surveyed by an archeologist, and no sites will be disturbed by these proposals. An archeological clearance will be obtained prior to construction activities.

Increased visitation may result from the proposed road improvements. However, this increase does not necessarily mean an increase in cumulative impacts upon the monument's cultural resources. Road pull-outs and paved roadways offer visitors a more structured experience, helping to prevent informal foot trails and off-road parking, both of which contribute to resource degradation. Design of these formalized highway features will avoid sites and funnel traffic into less sensitive areas.

In the event that significant archeological resources are discovered prior to implementation of this proposed action, design will avoid impacts to the sites. If it is not feasible to avoid impacts, mitigating measures will be developed in consultation with the California State Historic Preservation Office and the Advisory Council on Historic Preservation.

ALTERNATIVE B

Impact on Vegetation

The impact of this alternative on Joshua trees is summarized in the following table:

Routes 12 and 13				
			Non-Salvage	
Road Segment	Total Trees Affected	Salvage Mitigate/Transplant	Trees Lost*	Large Trees**
1	22	22	9	4
2	0	2	0	0
3	0	0	0	0
4	0	0	0	0
5	54	38	16	0
6	101	86	49	18
7	0	0	0	0
Total	177	148	74	22

* Includes total number of trees occurring in paved portions that are too large to be transplanted and an estimate of 40 percent loss from those trees eligible for transplanting or mitigation.

** Number of trees (included in the total) that are too large (typically more than 12 feet high and branched) to be transplanted or mitigated in place. They do not represent the large and unique photogenic roadside trees that are popular with the public – none of these trees are affected.

A total of 177 Joshua trees (the least of all in the action alternatives) would be affected by the road reconstruction in this alternative. Of these, 74 trees, 22 of which are large individuals, would not be expected to survive. The remaining 103 trees would be mitigated in place or transplanted with a tree spade and expected to survive. As shown in the table, the greatest impact on the Joshua trees is in segment 6. Since the narrowest road width has already been selected for this section, reduction in the impact on Joshua trees could only come from banning wide vehicles or reducing the design speed along this route.

Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species.

Other salvageable species affected by the realignment include Mojave Yuccas (45 individuals), Parry's Nolina (1 individual), and various cacti (220 individuals). Survival rates for transplants of this group

as a whole are approximately 75 percent. Thirty Pencil Cholla also occur within the proposed corridor and previous experience indicates that individuals seldom survive transplanting.

Additionally, 87 *Juniperus californica* were noted along Route 13. Many of these junipers are large, noble individuals that cannot be transplanted due to their size and configuration. All of these trees will be saved through maintaining the same roadway alignment for this route.

Impact on Visitor Experience, Park Management, and Safety

The current visitor experience, of driving through a desert forest on a narrow road, will be maintained by making 6.25 miles of Route 12 (segments 2, 3, 4) a one-way road and maintaining the narrow width of segments 1, 6, and 7. The visitor experience would be the same or enhanced (one-way sections) on 100 percent of the current roadway. On the one-way routes, the experience will be more relaxing since visitors can spend more time enjoying the scenery and less time worrying about oncoming traffic. Paving the Queen Valley road and converting it to one-way would change the visitor experience in the same manner as described in alternative A.

Since the one-way sections in this alternative are longer than in alternative A, it poses more inconveniences for visitors. To mitigate this impact, the trail system mitigation of alternative A would also apply here. Looking at the traffic flow through the area, there are two possible problems with one-way traffic. Vehicles traveling from east to west would have to go an additional 1.75 miles through the Hidden Valley area to get to Keys View, a popular overlook. In order to proceed from Keys View to the west entrance, one would have to make an easterly loop on Route 12, an additional 7.75 miles. Similarly users of Ryan campground would have to go an additional 10.75 miles to Keys View and an additional 9 miles to the west entrance. As discussed in the section Alternatives Considered But Rejected, this second scenario may be mitigated by giving campers access to the Keys View road via one of the many abandoned dirt roads in the area.

Impact on the Desert Tortoise

This alternative would affect the following number of acres of potential desert tortoise habitat:

Estimated Number of Tortoises/km²*			
Segment	**0-7**	**1-7**	**8-29**
1	0.9	0.3	–
2	0.0	0.0	–
3	0.0	–	–
4	0.0	–	0.0
5	–	0.7	1.3
6	4.4	–	0.3
7	0.0	–	–
Total	5.3	1.0	1.6

*Road segments bordering more than one tortoise density category were placed in the higher density category.

Realigning segments 1, 5, and 6 will result in the loss of 7.9 acres of potential tortoise habitat along the road shoulders. One acre is in an area of moderate (8-29/km) tortoise density. The one-way road segments (2, 3), since they will not be widened, should not affect desert tortoise habitat. The impacts of paving of the Queen Valley Road and increasing its traffic load would be the same as in alternative A.

Mitigation of construction impacts would be the same as in alternative A.

The amount of potential desert tortoise habitat affected in this alternative is less than in alternative A so the same conclusion, i.e., no adverse affect on the species is anticipated.

Impact on Cultural Resources

Since the sites identified in the Affected Environment section are close to the roadway, this alternative would have the same effects as in alternative A. Such effects would be less than in alternative A since less area would be altered.

ALTERNATIVE C

Impact on Vegetation

The impact of this alternative on Joshua trees is summarized in the following table:

Routes 12 and 13				
			Non-Salvage	
Road Segment	Total Trees Affected	Salvage Mitigate/Transplant	Trees Lost*	Large Trees**
1	26	23	12	7
2	256	225	121	67
3	27	22	14	7
4	37	27	21	14
5	0	0	0	0
6	126	109	61	24
7	244	185	133	75
Total	716	591	362	194

* Includes total number of trees occurring in paved portions that are too large to be transplanted and an estimate of 40 percent loss from those trees eligible for transplanting or mitigation.

** Number of trees (included in the total) that are too large (typically more than 12 feet high and branched) to be transplanted or mitigated in place. In this alternative, some trees are the large and unique photogenic roadside trees popular with the public.

A total of 716 Joshua trees, the largest found in any alternative, would be affected by the road reconstruction in this alternative. Of these, 362 trees, 194 of which are large individuals, would not be expected to survive. The remaining 354 trees would be mitigated in place or transplanted with a tree spade and expected to survive. As shown in the table, the greatest impact on the Joshua trees is in segments 2 and 7.

Realignment of Route 112 in the Indian Cove area will not affect any Joshua trees or other sensitive species.

Other salvageable species affected by the realignment include Mojave Yuccas (170 individuals), Parry's Nolina (1 individual), and various cacti (575 individuals). Survival rates for transplants of this group as a whole are approximately 75 percent. Eighty-five Pencil Cholla also occur within the proposed corridor and previous experience indicates that individuals seldom survive transplanting.

Additionally, 154 *Juniperus californica* were noted along both routes. Many of these junipers are large, noble individuals that cannot be transplanted due to their size and configuration. Approximately 40-55 of these trees may be saved through mitigation or transplanting.

Impact on Visitor Experience, Park Management, and Safety

Since all road sections would be widened, the current visitor experience, of driving through a desert forest on a narrow road, will be lost in this alternative. That experience is illustrated in the photographs accompanying the discussion of the impacts of alternative A.

Each reconstructed road will have a base which provides structural support through paved shoulders. This structural base will reduce maintenance, protect the initial capital investment of the road, ensure that the road will last for the normal 15 to 25-year service life, provide a smoother ride, and protect the road edge, which not only reduces maintenance but accident potential. All drainage will be improved with well designed low water crossings and/or curbs, self-cleaning culverts, lined ditches, armoured leading/trailing edges of low water crossings, etc. These improvements will substantially reduce the average annual maintenance requirements for these roads.

Visitor safety will improve since all roads will provide adequate width to accommodate large vehicles. All visitors will be able to easily travel between all sites in this alternative. Additionally, alignment changes will make all road sections potentially safer. There will be adequate width to accommodate passing slower vehicles. In summary, the numbers of accidents, serious injuries, and fatalities should all be substantially reduced from the no action alternative.

Impact on the Desert Tortoise

This alternative would affect the following number of acres of desert tortoise habitat:

Estimated Number of Tortoises/km²*			
Segment	**0-7**	**1-7**	**8-29**
1	1.1	0.4	–
2	6.5	2.2	–
3	1.1	–	–
4	1.6	–	2.2
5	–	0.0	0.0
6	5.7	–	0.3
7	5.2	–	–
Total	21.2	2.6	2.5

*Road segments bordering more than one tortoise density category were placed in the higher density category.

Widening and realigning segments 1, 2, 3, 4, 6, and 7 will result in the loss of 26.3 acres of potential tortoise habitat along the road shoulders. Two and one-half of these acres are in an area of moderate (8-29/km²) tortoise density. Widening and realigning these roads could lead to an increase in traffic speed – and additional tortoise roadkills. Based on current experience with such road kills, and since all road segments are widened in this alternative, they can be expected to average less than one per year. Since segment 5 would not be paved in this alternative, no additional impacts on the tortoise would occur in that area.

Mitigation of construction impacts on the tortoise would be the same as in alternative A.

Although this alternative affects the largest acreage of potential desert tortoise habitat, the amount of acreage affected (26.3 acres) is not significantly different from the other two alternatives (16.3, and 11.7 acres, respectively). The same conclusion of no adverse impact on the species is reached for this alternative.

Impact on Cultural Resources

Since the sites identified in the Affected Environment section are close to the roadway, this alternative would have the same effects as alternative A. Such effects would be greater than in alternative A since more area would be altered under this alternative.

ENVIRONMENTAL CONSEQUENCES-ASSOCIATED VISITOR USE AREAS

NO ACTION

Impact on Vegetation

Under this alternative, native vegetation, including Joshua trees at the edge of poorly defined parking areas would continue to be trampled by visitors driving off the pavement to park. Such vegetation losses amount to approximately .1 acres and one or two Joshua trees per year or one acre and 10-20 trees in ten years.

Impact on Visitor Experience, Park Management, and Safety

This alternative proposes no modifications to the associated visitor use areas. These areas would continue to be maintained and repaired on an "as needed" basis, but no substantial improvements would be done. Visitor convenience and safety, lack of adequate parking, lack of orientation, and substandard restroom facilities would continue to be major concerns.

Designated parking capacity would remain at 329 cars and 21 RVs or approximately one third of the peak season use.

The visitor experience would continue unchanged in this alternative.

Impact on the Desert Tortoise

This alternative would have no additional effect on the desert tortoise.

Impact on Cultural Resources

This alternative would have no additional effect on cultural resources.

ALTERNATIVE A (PREFERRED)

Impact on Vegetation

Since the project area is in some of the finest Joshua tree stands in the park, a survey of trees potentially affected by construction was conducted. The construction area surveyed included all possible areas to be affected during construction of facilities. This was based on recent reconstruction of other areas in the monument. Classification of trees in salvageable, non-salvageable, mitigation, transplant, and loss categories was done in the same manner as the roadway survey (described in that impact section). As with that survey, the data reported here represent estimates and are optimistic in terms of salvage potential. It is estimated that approximately 40 percent of trees marked for mitigation or transplanting will not survive. This should be understood when reviewing this information.

The redesign and reconstruction of the associated visitor use areas has been planned to reduce the impact on Joshua trees. As shown in the following table, these developments will affect 113 Joshua trees, 77 of which can be transplanted leaving (after the 40 percent loss reduction) a probable net loss of 57 trees.

Implementation of this alternative would substantially reduce the net effect of visitation on native vegetation. This will be a direct result of confining driving and parking to designated paved areas, which have been adequately sized to meet peak season use, and locating them so that they properly serve the popular visitor use areas. These actions will limit current resource damage from vehicles and "trailing".

Impact on Visitor Experience, Park Management, and Safety

The designated parking capacity will be increased from 329 cars and 21 RVs to 825 cars and 161 RVs – roughly equal to the current spring visitation. This represents an increase in designated parking capacity of 156 percent for cars and 700 for RVs.

Visitor safety will improve by providing well defined parking areas thereby maintaining parking capacity but eliminating informal pullouts presently used by visitors. Placing pullouts where adequate sight distance provides safe ingress and egress will reduce the number of potential accident locations along both the main park routes and access roads to the developed areas. Improved development design as well as improved orientation should also reduce accident potential since visitors can concentrate on traffic hazards rather than worrying about where they are.

Park management and maintenance expenses will decline with the better defined and more logically arranged visitor use areas. For example, citations for illegal parking should decrease since visitors will know where to park. Maintenance of gravel parking areas and area restraints will not be required since these areas will be paved and well defined. Paved/striped areas use space more efficiently.

The visitor experience will change in two ways. First, the visual quality of the areas will be improved. Improvements would include site furniture (comfort stations, trash receptacles, barriers, fencing, wheel stops, and bicycle racks etc.) designed to blend into the natural setting. This would clear up the present clutter of vehicles parked haphazardly and provide well defined edges between the parking areas and the natural environment. The continually expanding edges of parking areas would be limited and the damaged areas would be revegetated with native vegetation. All these actions will contribute to the improved visual quality of the areas.

The second change in visitor experience will be directly related to the improvements discussed in the previous paragraph. While the proposed changes will improve visual quality, one of the present attractions of these areas is their dusty dirt road rustic appeal. While the sacrifice of this rustic experience is necessary to preserve park resources, the loss is one of the costs that comes with increasing visitor use. The rustic experience still exists in other areas of the monument.

Impact on the Desert Tortoise

Although the visitor use areas are in the threatened desert tortoise habitat described in the Affected Environment section, only one tortoise burrow was found in the project area. Tortoises may have

ASSOCIATED VISITOR USE AREAS DESIGNATED PARKING CAPACITIES – ALTERNATIVE A				
			Joshua Trees Affected	
Parking Areas	Cars	RVs	Salvageable	Non-Salvageable
1. Desert Environments	15	3	0	0
2. Rock Climbing Exhibit	30	6	0	0
3A. Wait Lot/Keys Ranch	–	–	0	0
3B. Boy Scout Hiking Trailhead	30	6	4	0
3C. Wonderland of Rocks Orientation – West	15	3	5	1
4A. Lost Horse Ranger Station Access Road	20	0	3	0
4B. Cyclops Formation	5	2	2	0
5. Hidden Valley – North Lot	15	3	1	0
6. Hidden Valley Trailhead	40	6	2	0
7. Turtle Rock Picnic Area	40	3	5	3
8. Hidden Valley Day Use Lot	–	–	–	–
9A. Intersection Rock	50	6	5	2
9B. Echo "Y"	25	–	0	0
10. Rock Pile Exhibit	–	–	–	–
11. Mojave Plants Exhibit	5	2	1	0
12. Cap Rock	14	6	1	1
13. Gauging Station/RV Drop	26	17	5	7
14. Juniper Flats Backcountry Trailhead	20	5	0	0
15. Lost Horse Mine	25	5	3	3
16. Black Brush Hillsides	5	0	2	2
17. Wonderland of Rocks Overlook	5	0	0	0
18. Keys View	45	0	1	0
19. Ryan Ranch	5	2	3	0
20. Ryan Turnout	–	–	–	–
21. Hall of Horrors	44	5	8	8
22. Ryan Mountain Trailhead/Indian Cave Exhibit	40	6	5	0
23. Geology Tour Road/Desert Queen Backcountry Trialhead	20	6	1	0
24. Wonderland of Rocks Orientation – East	15	3	2	0
25. Wall Street Mill/Barker Dam	75	5	7	1
26. Wonderland of Rocks Interpretive Exhibit	5	2	1	0
27. Traffic Control Pullouts	100	50	–	–
28. Wonderland of Rocks Backcountry Staging Area	75	5	6	4
29. Split Rock	16	4	4	4
30. Live Oak	–	–	–	–
31. Desert Nomads Exhibit	–	–	–	–
TOTALS	**825**	**161**	**77**	**36**

relocated due to the disturbance of visitors or tortoises inhabiting areas adjacent to traffic ways may have been killed by vehicles. Even though the associated visitor use areas are in tortoise habitat, these areas may not contain any tortoises. That is why the term potential tortoise habitat is used in the following discussions.

Construction of facilities in the associated visitor use areas will result in the loss of 11.34 acres of potential tortoise habitat. Restoration of 1.60 acres of terrain will leave a net loss of 9.74 acres of potential tortoise habitat. There would be a net loss of 1.64 acres in the area of moderate (8-29/km^2) tortoise density. The remaining acres to be affected by this construction (8.70 acres lost and 0.50 acres restored) are in areas of low tortoise density (0, 0-7, and 1-7/km^2).

To mitigate construction impacts on the tortoise, surveys will be conducted of active construction areas. If tortoises are discovered, mitigation techniques approved by the USFWS will be employed.

With the application of this mitigation and since there is only a small amount in potential habitat involved (11.34 acres) and most of this acreage is in areas of low tortoise density, this alternative is unlikely to have an adverse affect on the desert tortoise.

Impact on Cultural Resources

Since the sites identified in the Affected Environment section are close to the roadway and associated visitor use areas, this alternative would have the same effects as in alternative A, roadway section.

ALTERNATIVE B

Impact on Vegetation

The redesign and reconstruction of the associated visitor use areas has been planned to reduce the impact on Joshua trees. As shown in the following table, these developments will affect 66 Joshua trees, 36 of which can be transplanted leaving (after the 40% loss reduction) a probable net loss of 44 trees.

Since the project area is in some of the finest Joshua tree stands in the park, a survey of trees potentially affected by construction was conducted. The area surveyed included all possible areas to be affected during construction of facilities. This was based on recent reconstruction of other areas within the monument. Classification of trees in salvageable, non-salvageable, mitigation, transplant, and loss categories was done in the same manner as the roadway survey (described in that impact section). As with that survey, the data reported here represent estimates and are optimistic in terms of salvage potential. It is estimated that approximately 40 percent of trees marked for mitigation or transplanting will not survive. This should be understood when reviewing this information.

Implementation of this alternative would reduce the effect of visitation on native vegetation by confining driving and parking to designated paved areas. However, since these parking areas are considerably smaller than known peak visitation and are not located to serve all popular visitor use areas, a substantial amount of unauthorized parking and "trailing" can be expected to continue. While these actions will limit the resource damage from vehicles and "trailing" in some areas, it can be expected to continue in others.

ASSOCIATED VISITOR USE AREAS DESIGNATED PARKING CAPACITIES – ALTERNATIVE B				
			Joshua Trees Affected	
Parking Areas	Cars	RVs	Salvageable	Non-Salvageable
1. Desert Environments	15	3	0	0
2. Rock Climbing Exhibit	12	2	0	0
3A. Wait Lot/Keys Ranch	8	2	0	0
3B. Boy Scout Hiking Trailhead	-	-	0	0
3C. Wonderland of Rocks Orientation – West	5	0	2	0
4A. Lost Horse Ranger Station Access Road	0	0	0	0
4B. Cyclops Formation	0	3	0	0
5. Hidden Valley – North Lot	15	3	1	4
6. Hidden Valley Trailhead	22	3	8	0
7. Turtle Rock Picnic Area	20	0	3	2
8. Hidden Valley Day Use Lot	–	3	0	–
9A. Intersection Rock	35	3	2	1
9B. Echo "Y"	0	3	0	0
10. Rock Pile Exhibit	–	3	–	–
11. Mojave Plants Exhibit	0	3	8	0
12. Cap Rock	14	2	1	0
13. Gauging Station/RV Drop	0	17	0	8
14. Juniper Flats Backcountry Trailhead	0	5	0	0
15. Lost Horse Mine	0	5	0	8
16. Black Brush Hillsides	–	0	0	–
17. Wonderland of Rocks Overlook	5	3	0	0
18. Keys View	15	0	1	0
19. Ryan Ranch	5	5	8	0
20. Ryan Turnout	–	3	3	–
21. Hall of Horrors	14	5	8	8
22. Ryan Mountain Trailhead/Indian Cave Exhibit	8	2	6	4
23. Geology Tour Road/Desert Queen Backcountry Trialhead	14	5	0	0
24. Wonderland of Rocks Orientation – East	15	3	2	4
25. Wall Street Mill/Barker Dam	20	3	1	1
26. Wonderland of Rocks Interpretive Exhibit	5	0	1	4
27. Traffic Control Pullouts	100	50	8	8
28. Wonderland of Rocks Backcountry Staging Area	75	5	6	4
29. Split Rock	6	2	8	2
30. Live Oak	–	–	–	–
31. Desert Nomads Exhibit	–	–	–	–
TOTALS	497	115	36	30

Impact on Visitor Experience, Park Management, and Safety

All impacts on visitors will be the same as in alternative A with the following exceptions:

Park management and maintenance expenses will decline with the better defined and more logically arranged visitor use areas but probably not to the same degree as in alternative A, since alternative B would not provide sufficient parking spaces to accommodate the existing peak season use levels. For example, while citations for illegal parking should decrease since visitors will know where to park, there won't be as many parking spaces as demand warrants so citations will still occur.

The designated parking capacity will increase from 329 cars and 21 RVs to 497 cars and 119 RVs which represents an increase of 54 percent for cars and 500 for RVs.

Impact on the Desert Tortoise

Although the visitor use areas are in the threatened desert tortoise habitat described in the Affected Environment section, there may be no tortoises within these areas and the adjacent terrain. Tortoises may have relocated due to the disturbance of visitors or tortoises inhabiting areas adjacent to traffic ways may have been killed by vehicles. That is why the term potential tortoise habitat is used in the following discussions.

Construction of facilities in the associated visitor use areas will result in the loss of 6.61 acres of potential tortoise habitat. Restoration of 2.15 acres of terrain will leave a net loss of 4.46 acres of potential tortoise habitat. There would be a net loss of 1.06 acres in the area of moderate (8-29/km^2) tortoise density. The remaining acres to be affected by this construction (4.25 acres lost and 0.85 acres restored) are in areas of low tortoise density (0,0-7,and 1-7/km^2).

To mitigate construction impacts on the tortoise, surveys will be conducted of active construction areas. If tortoises are discovered, mitigation techniques approved by the USFWS will be employed.

With the application of this mitigation, the small area of potential habitat (6.61 acres), and this acreage in low tortoise density, this alternative is unlikely to have an adverse affect on the desert tortoise.

Impact on Cultural Resources

Since the sites identified in the Affected Environment section are close to the roadway and associated visitor use areas, this alternative would have the same effects as in alternative A, roadway section.

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APPENDIX A

AFFECT OF DIFFERENT ROAD WIDTHS ON JOSHUA TREES

ROAD SEGMENT	WIDTH	M/T*	LOST**	TOTAL AFFECTED
1	26	23	12(7)	26
	24	23	9(4)	23
	22	22	9(4)	22
2	26	225	121(67)	256
	24	194	105(61)	221
	22	158	86(49)	181
3	26	22	14(7)	27
	24	17	12(6)	22
	22	18	10(5)	21
4	26	27	21(14)	37
	24	24	18(11)	32
	22	18	17(10)	30
5	14	30	12(0)	30
6	26	109	61(24)	126
	24	93	54(19)	110
	22	86	49(18)	101
7	24	185	133(79)	244
	22	151	117(75)	208

* Includes total number of trees which could be tranplanted or mitigated in place.

** Includes total number of trees occuring in paved portions that are too large to be transplanted and an estimate of 40 percent loss from those trees eligible for transplanting or mitigation. The number of trees (also included in the total) that are too large to be transplanted or mitigated in place is indicated in parentheses.

APPENDIX B
CONSULTATION AND COORDINATION

In 1990, the government offices of San Bernadino and Riverside counties and the City of Twentynine Palms were asked to review an early draft copy of this document. Their comments are included in this appendix.

The California State Historic Preservation Office was provided an advance copy of this document for review prior to publication.

Section 7 of the Endangered Species Act directs all federal agencies to utilize their authorities in furtherance of the purposes of the act by carrying out programs for the conservation of endangered or threatened species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat.

Informal consultation with the U.S. Fish and Wildlife Service was initiated in June 1990 with a request for a list of species which may be present in the project area or be affected by the project. A list of one threatened species, the desert tortoise, and several candidate (presently under consideration as endangered or threatened but currently with no legal status) species was recieved and is included in this appendix. Consultations continued over the phone between monument resource management staff and the USFWS as the project developed. Topics discussed included the status of the project as well as methods of population surveys and mitigation techniques which may be necessary. The USFWS is also being sent a copy of this document for review.

CITY OFFICES
6136 ADOBE ROAD
P.O. BOX 995
TWENTYNINE PALMS, CA 92277
(619) 367-6799
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COUNCIL MEMBER
Lester W. Krushat, Mayor
Christopher J. Dobler, Mayor Pro Tem
Charles W. "Chuck" Bell
Jeffrey B. Dunn
Frederick A. "Fred" Libby

CITY MANAGER
Gene Haroldsen

September 21, 1990

Mr. Rick Anderson
Joshua Tree National Monument
74485 National Monument Drive
Twentynine Palms, CA 92277

Dear Ranger Anderson:

Re: Environmental Assessment; Reconstruction of Roads in the Joshua Tree National Monument.

The Draft Environmental Assessment for the reconstruction of roads in the Joshua Tree National Monument has been received and reviewed. The efficient functioning and environmental beauty of the Joshua Tree National Monument is of utmost importance to the City of Twentynine Palms. The opportunity to review this proposal is appreciated. Most of the subject material is outside of the field of expertise of the City and is in the bailiwick of the Park specialists. Consequently, this response is limited to the City's perspective.

The streets and projects in question are of sufficient distance from the City of Twentynine Palms so as not to affect the community directly. It is, however, in the City's best interest to resolve this road work in a manner that makes traveling on these roads both efficient and enjoyable. In effecting the project, there obviously has to be a compromise between those two objectives. The document accurately assesses the situation and makes an honest effort to compare the alternatives. I am satisfied with the quality and adequacy of the report. I am also satisfied with the stated preference, alternative "A", as being the best compromise of efficient travel vs. environmental preservation, given the necessity for the project.

It is the City's economic plan and strategy to better capitalize on the resources of the Monument; i.e. by providing R-V parks and other destination based tourist facilities near the entrance or Hwadquarters. In this manner, it will be possible to have more guided tours to mitigate the traffic by increased Park users. The City would also like to have established in the City, a bicycle staging and debarkation base near the Monument entrance. The proposed reconstruction of Park routes and off-road improvements would coincide with the City's plans.

The City of Twentynine Palms enthusiastically supports the efforts, programs and activities of the Joshua Tree National Monument. We also appreciate the staff's responses to environmental issues referred to them by the City. We look forward to a continued cooperative working relationship with the Monument staff.

Very truly yours,

William H. Gutgesell

William H. Gutgesell
Community Development Director/
Environmental Secretary

cc Bob Moon
Mr. Don Tiernan (fax)

RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 7, 1990

AR 9/12

Rick Anderson, Superintendent
United States Department of the Interior
National Park Service
Joshua Tree National Monument
74485 National Monument Drive
Twentynine Palms, CA 92277-3597

Dear Mr.Anderson:

This letter is in response to your request for comments on the Environmental Assessment for the Reconstruction of Park Routes 12 and 13 and Associated Visitor Use Areas, dated March, 1990. The document is a well researched study. The assessment of the native vegetation and the possible impacts of the project alternatives is excellent, as are the graphics.

It is recommended, however, that the section on cultural resources be expanded to include a more detailed discussion. Cultural resources are mentioned in the Introduction, the statement of Park Purpose, the section on Resource Significance, and in the Management Objectives. With eleven prehistoric sites having been located within the project study area thus far, it is obvious that cultural resources are an impartant resource within the Park, and should therefore be carefully considered.

The discussion on cultural resources should include a more detailed discussion on the nature of the prehistoric sites found within the project study area. A statement concerning the likelihood of locating additional sites within the Queen Valley road, Split Rock road, or Hidden Valley Campground areas should be included, as well as a general statement concerning the overall significance of such resources within the Park as they relate to the region. A brief cultural overview should also be included.

On page 14, paragraph 8, it is stated that the Arizona State Preservation Office shall be consulted concerning the appropriate mitigation measures. Perhaps it would be more appropriate to consult with the California SHPO.

In reviewing the EA, a discussion concerning the cumulative impacts of the proposed project alternatives to the Park was not found. Since improving the access within the Park will increase the number of visitors to the Park, the cumulative impacts should be addressed.

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RIVERSIDE, CALIFORNIA 92501
(714) 787-6181

79733 COUNTRY CLUB DRIVE, SUITE E
BERMUDA DUNES, CALIFORNIA 92201
(619) 342-8277

A statement concerning which alternative is environmentally superior was not found. Such a statement should be included. If the preferred alternative is not the most environmentally superior, then a statement explaining why it is preferred should be included in this discussion.

Since the Park is both geographically and topographically peripheral to the major population areas of Riverside County, it is suggested that comment to this EA be solicited from San Bernardino County. The City of Twentynine Palms should also review this document to obtain local opinion.

Very truly yours,

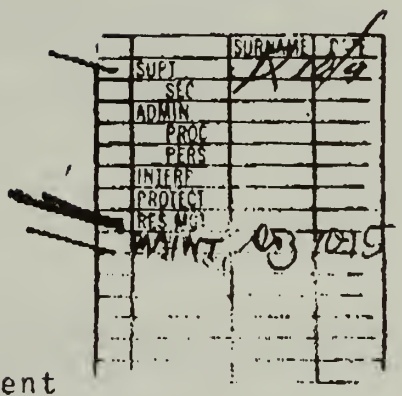
RIVERSIDE COUNTY PLANNING DEPARTMENT
Joseph A. Richards, Planning Director

Leslie J. Blodgett, Planner II

...CEIVED
... JOSHUA TREE NAT. MON.
OCT 9 '90

Board of Supervisors
County of San Bernardino

MARSHA TUROCI
SUPERVISOR, FIRST DISTRICT



October 5, 1990

Joshua Tree National Monument
74485 National Monument Drive
Twentynine Palms, California 92277
Rick Anderson

Dear Rick,

The Environmental Assessment Draft sent to the County of San Bernardino regarding the addition of a loop road is out of the county's jurisdiction, however I would like to comment on your plans.

A review of environmental consequences associated with each of the identified alternatives indicates that a significant potential impact exists for the Joshua Trees. While other species of plants and animals could be affected, clearly long-lived specimens of yucca brevifolia could be the big looser. It is also obivous that this threat is acknowledged and addressed by the assessment. Alternative A (preferred) offers the most reasonable prescription for minimizing impacts to all vegetation as well as Joshua Trees. Details for mitigation such as transplanting with a tree spade, appear to represent the best available technology for salvaging as many specimens as possible.

As you know, protection of sensitive desert species such as the Joshua Tree is an issue of concern in our developing rural areas. Frankly, we have often directed developers, property owners and other county offices to contact your office of resources management for guidance on proper care andhandling of indigenous species such as yucca brevifolia.

Please let me know if we can be of further assistance.

Sincerely,

Donna Munoz
Field Representative

United States Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
Laguna Niguel Office
Federal Building, 24000 Avila Road
Laguna Niguel, California 92656

August 28, 1990

Memorandum

To: National Resource Specialist, Denver Service Center, National Park Service (Attn: Don Tiernan, DSC-TWE)

From: Office Supervisor, Southern California Field Station

Subject: Endangered Species Information for Joshua Tree National Monument Parking/Road Improvements and Management Plan (1-6-90-SP-741)

This letter is in response to your letters dated June 26 & 27, 1990 and received by us on July 2, 1990 requesting information on endangered, threatened, and candidate species which may be present within the area of the subject project in San Bernardino and Riverside Counties, California.

The attached list of species fulfills the requirements of the Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act of 1973, as amended (Act).

Your agency has the responsibility to prepare a Biological Assessment if the project is a construction project which may require an Environmental Impact Statement. If a Biological Assessment is not required, the agency still has the responsibility to review its proposed activities and determine whether the listed species will be affected.

During the assessment or review process, the agency may engage in planning efforts, but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of Section 7(a) of the Act. If a listed species may be affected, your agency should request, in writing through our office, formal consultation prusuant to Section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation.

We have also included a ist of candidate species presently under review by this Service for consideration as endangered or threatened. It should be noted that candidate species have no protection under the Act. Therefore,

the Federal agency is not required to perform a Biological Assessment for candidate species nor to consult with the Fish and Wildlife Service should you determine that your project may affect candidate species. They are included for the sole purpose of notifying Federal agencies in advance of possible proposals and listings which at some time in the future may have to be considered in planning Federal activities. If early evaluation of your project indicates that it is likely to adversely impact a candidate species, you may wish to request technical assistance from this office.

Should you have any question regarding the species listed or your responsibilities under the Act, please call Arthur Davenport at (714) 643-4270.

Enclosure

Brooks Harper

Listed and Proposed Endangered and Threatened Species and Candidate Species That May Occur In The Area of Joshua Tree National Monument Management Plan/Road and Parking Improvements (1-6-90-SP-741)

LISTED SPECIES

Reptiles		
Desert Tortoise	Gopherus agassizii	(T)
CANDIDATE SPECIES		
Birds		
Ferruginous hawk	Buteo regalis	(2)
Invertebrates		
Desert Monkey Grasshopper	Psychomastix deserticola	(2)
Brown-tassel trigonoscuta weevil	Trigonoscuta brunnotasselata	(2)
Dohrn's elegant eucnemid beetle	Paleoxenus dohrni	(2)
Mojave Desert blister beetle	Lytta inseparata	(2)
Death Valley June beetle	Polyphylla erratica	(2)
White desertsnail	Eremarionta immaculata	(2)
Morongo desertsnail	Eremarionta morogoana	(2)
Plants		
San Bernardino rock cress	Arabis breweri var. pecuniaria	(2)
White bear desert poppy	Arctomecon merriamii	(2)
Forest Camp sand wort	Arenaria macradenia var. kuschei	(2)
Lane Mountain milk-vetch	Astragalus jaegerianus	(2)
(No common name)	Astragalus lentiginosus var. sierrae	(2)
Tripple-ribbed milk vetch	Astragalus tricarinatus	(2)
Alkali mariposa	Calochortus striatus	(2)
Alverson's pincushion	Coryphantha vivipara var.	(2)

cactus	*alversonii*	
Howe's hedgehog cactus	*Echinocereus engelmannii* var. *howei*	(2)
Little San Bernardino Mountains Gilia	*Gilia maculata*	(2)
Mojave tarweed	*Hemizonia mohavensis*	(1)
Amargosa Penstemon	*Penstemon fruticiformis* var. *amargosae*	(2)
Stephen's Penstemon	*Penstemon stephensii*	(2)
Orocopia sage	*Salvia greatai*	(2)

(E) -Endangered
(T) -Threatened
(1) -Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2) -Category 2: Taxa for which existing information indicates that listing may be warranted, but for which substantial biological information to support a proposed rule is lacking.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1991—573-040/20,074 REGION NO. 8

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the Branch of Publications and Graphic Design of the Denver Service Center. NPS D-51 August 1991